

Table of Contents

Volume I:	
Introduction	1
Journey To Moscow (July 16-18)	3
Moscow	6
Ministry of Agriculture	11
Agricultural Exhibition	14
The Kremlin	17
SOVIET JOURNAL	20
Lenin Academy	23
Bokachaisv Institute	31
Timiryazev Academy	37
Pedology Department, University of Moscow	42
Institute of Fertilizers	51
Minsk	(Volume I)
Ministry of Agriculture	52
Amelioration Institute	56
Experimental Farm	62
Drainage Machines	69
Comintern Collective Farm	73
Machins-testing Station	76
New Life Collective Farm	79
Kiav	84
October Collective Farm	87
Agricultural Fair	95
Ministry of Agriculture	96
Kiav to Poltava by car	101
Stalin Collective Farm	106
Poltavskaya Oblast	110
Poltava Experimental Farm	111
Poltava to Dnepropetrovsk	116
Dnepropetrovsk	122
Orshouikidze Collective Farm	123
Dneprovski State Farm	130
Research Institute on corn	133
Rostov	140
Institute on Water Economy	142
Koisug State Farm	147
Red Orchard State Farm	152
Lenin Collective Farm	153
Krasnodar	161
Department of Water Economy	162
Kuban Rice Station	167
Table of conversions of units of measure	173a
Volume II:	
Kuban Rice Field Station	174

SOVIET JOURNAL

(Volume I)

(16 July to 2 August)

Charles E. Kellogg

1958

Table of Contents

Volume I:	182
Introduction	1
Journey To Moscow (July 16-18)	3
Moscow	6
Ministry of Agriculture	11
Agricultural Exhibition	14
The Kremlin	17
Lenin Academy	20
Dokuchaiev Institute	25
Timiryazev Academy	31
Pedology Department, University of Moscow	37
Institute of Fertilizers	42
Minsk	51
Ministry of Agriculture	52
Amelioration Institute	56
Experimental Farm	62
Drainage Machines	69
Comintern Collective Farm	73
Machine-testing Station	76
New Life Collective Farm	79
Kiev	84
October Collective Farm	87
Agricultural Fair	95
Ministry of Agriculture	98
Kiev to Poltava by car	101
Stalin Collective Farm	106
Poltavskaya Oblast	110
Poltava Experimental Farm	111
Poltava to Dnepropetrovsk	116
Dnepropetrovsk	122
Orzhonikidze Collective Farm	125
Dneprovski State Farm	130
Research Institute on corn	133
Rostov	140
Institute on Water Economy	142
Koisug State Farm	147
Red Orchard State Farm	152
Lenin Collective Farm	153
Krasnodar	161
Department of Water Economy	162
Kuban Rice Station	167
Table of conversions of units of measure	173a
Volume II:	
Kuban Rice Field Station	174

Table of Contents

174	Kuban Rice Field Station	Volume II:
173	Table of conversions of units of measure	
167	Kuban Rice Station	
162	Department of Water Economy	
161	Krasnodar	
153	Lenin Collective Farm	
152	Red Orchard State Farm	
147	Kolauk State Farm	
142	Institute on Water Economy	
140	Rostov	
133	Research Institute on corn	
130	Dneprovsk State Farm	
125	Orshonikidze Collective Farm	
122	Dnepropetrovsk	
116	Poltava to Dnepropetrovsk	
111	Poltava Experimental Farm	
110	Poltavskaya Oblast	
106	Stalin Collective Farm	
101	Kiev to Poltava by car	
98	Ministry of Agriculture	
92	Agricultural Fair	
87	October Collective Farm	
84	Kiev	
79	New Life Collective Farm	
76	Machine-testing Station	
73	Communist Collective Farm	
69	Drainage Machines	
62	Experimental Farm	
56	Amelioration Institute	
52	Ministry of Agriculture	
51	Minsk	
42	Institute of Fertilizers	
37	Pedology Department, University of Moscow	
31	Timiryazev Academy	
25	Dokuchaev Institute	
20	Lenin Academy	
17	The Kremlin	
14	Agricultural Exhibition	
11	Ministry of Agriculture	
6	Moscow	
3	Journey to Moscow (July 16-18)	
1	Introduction	Volume I:

II

Krasnoarmeisk State Farm	182
Michurin Collective Farm	184
Stalingrad	192
Agricultural Educational Institute	195
Institute of Agro-Forest Amelioration	198
Fortieth Anniversary of October Collective Farm	202
Stalingrad-Moscow-Tashkent	209
Uzbek Ministry of Agriculture	214
Institute for Water Economy	219
Hungry Steppe	224
Akhun Babaev Collective Farm	225
Institute on machinery	231
Akkavak Station	235
Plant Breeding Institute	243
Andizahn	246
Savay State Farm	255
Sverdlov Collective Farm	265
Tashkent	272
Akmolinsk	280
Dawning Collective Farm	282
Unification Collective Farm	285
Eighteenth Anniversary of the Kazakhstan Republic Collective Farm	286
Kazakh Research Institute	289
Shortandinski State Farm	299
Return to Akmolinsk	304
Akmolinsk-Moscow	307
Moscow	309
Moscow-New York	318
Table of conversions of units of measure	325
Carbon-nitrogen ratios on 5 soil samples	326
Some Soviet Press Reports on Mission	

Mr. Joseph J. Bulik

Foreign Agricultural Service
United States Department of Agriculture

Dr. L. S. Nelson, Chief,
Eastern Soil and Water Management Research Branch
Division of Soil and Water Conservation Research
Agricultural Research Service

Dr. W. H. Allaway, Assistant Director,
Division of Soil and Water Conservation Research
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326	Carbon-nitrogen ratios on 5 soil samples
325	Table of conversions of units of measure
318	Moscow-New York
309	Moscow
307	Akmolinsk-Moscow
304	Return to Akmolinsk
299	Shortandinaki State Farm
289	Kazakh Research Institute
286	Collective Farm
282	Eighteenth Anniversary of the Kazakhstan Republic
282	Unitization Collective Farm
280	Dawning Collective Farm
280	Akmolinsk
272	Tashkent
262	Sverdlov Collective Farm
252	Savay State Farm
246	Andizhan
243	Plant Breeding Institute
232	Akkavak Station
231	Institute on machinery
222	Akhun Babayev Collective Farm
224	Hungry Stepe
219	Institute for Water Economy
214	Uzbek Ministry of Agriculture
209	Stalingrad-Moscow-Tashkent
202	Fortieth Anniversary of October Collective Farm
198	Institute of Agro-Forest Amelioration
192	Agricultural Educational Institute
192	Stalingrad
184	Michurin Collective Farm
182	Krasnoarmeisk State Farm

Mr. W. W. Donnan
Principal Director
Division of Soil and Water Conservation Research
Agricultural Research Service (California)

Introduction

Dr. D. W. Thorne, Director

During the winter of 1957-58 agreements were reached between the Government of the United States and that of the Soviet Union providing for cultural exchanges in various fields of science, health, and education, including exchanges of agricultural scientists. When I returned from India in February 1958, I learned in notes on the spot. Commonly, these notes were taken in great haste and under far less than ideal conditions. Some of them may be inaccurate. I received some inconsistent statements about farm production. Quite likely I did not always hear and record accurately. Then too, translations, and especially double translations, can lead to error. Certain tentative conclusions that are noted may be changed themselves.

with more information and reflection. Readers of this Journal

Besides myself as chairman, the Mission included the following members:
are not to quote material from it for publication without permission in writing.

Mr. Joseph J. Bulik
Foreign Agricultural Service
United States Department of Agriculture
Beside the text of these notes, there is a set of kodachrome transparencies.

Dr. L. B. Nelson, Chief,
Eastern Soil and Water Management Research Branch
Division of Soil and Water Conservation Research
Agricultural Research Service

Dr. W. H. Allaway, Assistant Director,
Division of Soil and Water Conservation Research
Agricultural Research Service

Introduction

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members:

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Foreign Agricultural Service
United States Department of Agriculture

Dr. L. B. Nelson, Chief,
Eastern Soil and Water Management Research Branch
Division of Soil and Water Conservation Research
Agricultural Research Service

Dr. W. H. Allaway, Assistant Director,
Division of Soil and Water Conservation Research
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Mr. W. W. Donnan
Principal Drainage Engineer
Division of Soil and Water Conservation Research
Agricultural Research Service (California)

Dr. D. W. Thorne, Director
Utah State Agricultural Experiment Station
Logan, Utah

Dr. M. G. Cline
Professor of Soil Science
Cornell University

This Journal is an account of my observations as taken down in notes on the spot. Commonly, these notes were taken in great haste and under far less than ideal conditions. Some of them may be inaccurate. I received some inconsistent statements about farm production. Quite likely I did not always hear and record accurately. Then too, translations, and especially double translations, can lead to error.

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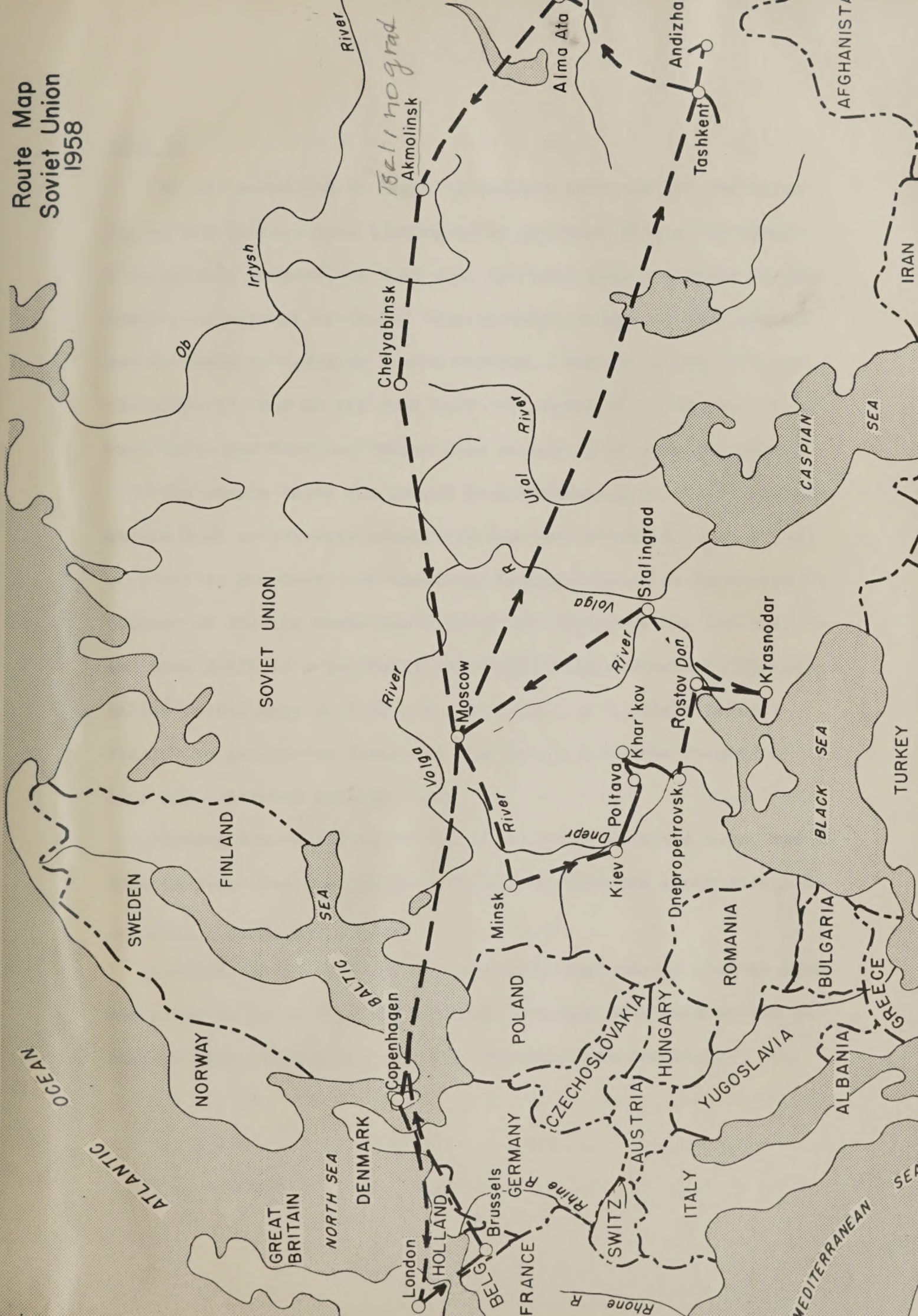
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Professor of Soil Science
Dr. M. G. Cline

Logan, Utah
Utah State Agricultural Experiment Station
Dr. D. W. Thorne, Director

Agricultural Research Service (California)
Division of Soil and Water Conservation Research
Principal Drainage Engineer
Mr. W. W. Donnan

Route Map
Soviet Union
1958



July 16

We are scheduled to leave by Eastern Airlines for the first leg of our journey from Washington to New York City at 12 noon. I am called, however, at 9:45 a.m. and told that I must be at the Washington Airport at 10:30! Fortunately, I have my bags packed and am ready to leave in 3 or 4 minutes. What a hurried trip to the airport! But we all just make it, except for Cline who is to meet us in New York and Thorne whom we are to meet in Brussels.^{1/}

The wheels leave the ground from Washington at 10:45 a.m. and we are down at Idlewild Airport in New York at 12:22 p.m. It is very hot in New York. We check our baggage, which is in excess because of all the books and film we are taking to the Soviets, and have lunch in a partially air-conditioned restaurant. We are called to the gate at 3:45 p.m., but there is a slight delay. Finally we get on the plane and the wheels leave the runway at 4:43 p.m., eastern daylight time.

I have a nice dinner, a little chit-chat with the boys, and then to bed. One day passes into another over the North Atlantic.

1/ Added later: I found out afterward that the 12 o'clock plane was going to be so late that Eastern Airlines made this switch so that we might be sure to have our connection in New York.

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July 17

I am up in broad daylight after five and a half hour's sleep, then breakfast. It always seems fast going to Europe because we set our clocks ahead 5 hours. We stop at the London airport. The air is refreshing after the heat of New York and Washington. The wheels leave the ground for Brussels at 11:11 a.m., and they are down in the Brussels airport at 12:13 p.m.

Here we meet Dr. Thorne and I give him his tickets and passport. We also see Mr. Andre G. de Pauw from our Embassy in Brussels. Several of my Belgian friends meet me, including Director-General Jurion, Dr. Fripiat, and Mr. Ameryck, of INEAC. While waiting for luggage, I also have a little chat with Dirk Tavernier who had come in to meet me. His father, Rene, had left just the day before for the Belgian Congo.

Dr. Fripiat takes several of us to our hotel, the Amigo, which is a new one built for use this year of the Fair. We deposit our luggage and Dr. Fripiat takes us out to the Fair where I try to get some pictures. We find enormous crowds and many automobiles; it seems that nearly everyone has a camera.

Of course, we have only a short time. I go into the American exhibit which, on the whole, I like very much. There had been complaints that the Americans did not show enough machinery, but I do not agree. Everyone knows that America has a lot of machinery and I think the exhibit does well in creating a relaxed and pleasant atmosphere and in showing something of the cultural side of American life.

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We also visit the Soviet exhibit where there is a great deal of machinery of all sorts including copies of modern European and American automobiles. It would not surprise me any if these were the only examples built in the Soviet Union, although I do not know. I have the impression that the Soviets are trying a bit too hard. But they do have some very nice exhibits and I am interested to look at the agricultural ones and at the agricultural machinery they have parked outside.

I take a quick look at the Czechoslovakian pavilion to see the very nice crystal I had heard about. But it does not take long to get very tired at this sort of thing.

Near the dinner hour I go through the excellent exhibit of agriculture and native life in the Belgian Congo. After this I have a fine dinner with Director-General and Madame Jurion and Dr. and Madame Fripiat. Although I am getting tired they rather insist that we take a bus trip around the fairgrounds to see the general layout under all the lights. It is an enormous place and very beautiful; but one needs at least a week.

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After breakfast and some letters I take a little walk including a visit to the beautiful Hotel de Ville of Brussels.

We get out to the airport at 10:30 for our trip to Moscow and check in, except for Dr. Thorne. Somehow he failed to understand the arrangements and just barely makes it.

We pass through security and into a new Russian jet of Aerflot. This plane is called TU 104 - a beautiful jet with two engines.

Today is warm and sunny and it is warm in the plane while we wait for the take-off.

The wheels are up at 11:55 a.m., and in a few minutes we are up to about 9 or 10 thousand meters. Now it is cool and the plane is very smooth indeed! We go north towards Copenhagen.

I go up into the pilot's cabin. Never have I seen so many instruments in one place! How in the world anyone can keep track of all these is beyond me. The navigator sits forward of the pilot and co-pilot in a kind of nose made from what looks like glass and what I suppose to be plastic. The pilot gives me the following statistics: Altitude, 35,000 feet; temperature outside, -32°C; and speed, 540 miles per hour plus 36 miles per hour tail wind.

During most of the trip we are above clouds. The lunch is nice but less fancy than on the other European and American lines. I have bread, a roll, cheese, an orange, beefsteak, potatoes, peas, caviar, cake, and tea. I put my watch ahead another two hours and the wheels are down in Moscow at 4:58. No one is on hand to meet us from our

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Embassy, but we are met by several high officers of the Ministry of Agriculture and of the Academy of Sciences of the USSR including the following:

A. N. Askochinski, Member of the Agricultural Academy and
of the Ministry of Agriculture

Academician Tyurin, Director of the Dokuchaiev Institute
of Soil Science

Mr. Kharchenko, Head of the Foreign Department of the
Ministry of Agriculture

Mr. Yakushkin, of the Institute of Agricultural Economics

Mme. Lily Baranova, from the All-Union Agricultural Exhibition

I have a long talk with Tyurin while we wait for passports and luggage. We get into the cars about 6:20 p.m. and are driven to the Moskva Hotel.

We go down for dinner at 8 o'clock and I find Dr. Rodenhiser, Dr. Erlanson, Dr. Magness, and other members of the Crops Mission. They say that their visits are going fine.

I had had a message to call the Embassy at the air station and I had tried again at the hotel but discovered they had given me the wrong number. Mr. Bulik was able to get the right number and we discovered that while we were landing at the Moscow airport a managed demonstration of Soviet workers had assaulted our Embassy and broken many windows. It is curious how this kind of thing happens while we were receiving such a warm and kind welcome from highly placed Soviet scientists and administrators.

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while we were receiving such a warm and kind welcome from highly

placed Soviet scientists and administrators.

We have a very slow dinner. Tom Venables, our agricultural attaché in Moscow, comes in and says that 10,000 demonstrated before the U. S. Embassy today and broke 300 panes of glass - all in fun!^{2/}

I do my washing and write letters after dinner. Mr. Bulik comes in quite late. He tells me a story of two students who spoke to him on the street this evening. He asked them if they were at the American Embassy. They replied they had not been because they were students on leave and not workers and so were not required to go! He asked them why they wanted to talk to Americans and one of them replied: "We live too much in our own soup and need to talk with others."

^{2/} Added later: Other embassy people told me that the police worked hard to control the demonstration. Apparently the ministry controlling the police opposed it even though it was stimulated by other ministry officials through the trade union. Yet certainly everyone has been very friendly to me so far.

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K-2505. July 19, 1958. Moscow.
Street scene near center of city.



K-2506. July 19, 1958. Moscow.
Street scene near center of city.

K-2505

K-2505

II-1

K-2505. July 19, 1958. Moscow.
Street scene near center of city.

K-2506

K-2506

II-2

K-2506. July 19, 1958. Moscow.
Street scene near center of city.



K-2507. July 19, 1958. Moscow.
The Kremlin wall.

K-2508. July 19, 1958. Moscow.
American Embassy the day after the "assassination" and
breaking of windows.

K-2507. July 19, 1958. Moscow.
The Kremlin wall.

July 19

This morning I went out to the Embassy.
In Vansbly's office I saw a report from the State
Department saying that the Soviet Union was
not by scientific methods but by the Agricultural
the telegram saying that the



to the farm. The Soviet Union

K-2508. July 19, 1958. Moscow.

and technical American Embassy the day after the "demonstration" and
breaking of windows.

collectives, the Soviet Union was not by scientific methods but by the Agricultural

supplies of fertilizers and pesticides were being sent to the farms for drainage

and the like that would not be needed permanently on any one farm.

K-2508. July 19, 1958. Moscow.
American Embassy the day after the "demonstration" and
breaking of windows.

July 19

This morning is warm and sunny. We go out to the Embassy. In Venables' office I see the telegram sent back to the State Department saying that our group arrived safely and that we were met by scientists and high officials of the Academy and of the Agricultural Ministry. I am a bit sorry that they did not send the telegram through commercial channels just as I had given it to them last night. This one went through code and will be a long time getting to our people.

Venables talks with us awhile and says that he understands some recent changes have been made.

1. The peasants no longer need to give any part of their income from their small individual plots to the state. What they get from these family plots they can consume or take to the local farmers' market or sell to the state at higher prices than formerly.

2. In April 1958 there was issued a new decree for reorganization of the machine and tractor stations. Formerly these stations received produce from the farms to deliver to the state for doing the machine work on the farm. Now the machines have been, or are being transferred, to the farms. The farms buy them. The stations are now called repair and technical stations. They not only repair machines for the collectives, but also help service the purchase and delivery of supplies of fertilizer and maintain some heavy machines for drainage and the like that would not be needed permanently on any one farm.

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3. On July 1 a new system for procuring agricultural supplies, is supposed to have been put into effect. The Gosplan (the All-Union Central Planning Agency) draws up procurement plans and these go down through the various levels of the government. Presumably they are based on the needs of the people. Compulsory deliveries for whole farms are abolished. He doesn't think that this will make much difference in procurement, but that farmers will now receive higher prices in contrast to what they received formerly. Under the old scheme the obligatory deliveries get rather low prices and deliveries above that base get relatively higher prices. The new prices are a compromise and in all cases equal to or above the old prices for comparable deliveries. Then of course, out of this increased income the farms must buy their own machinery and maintain it. He thinks that possibly somewhat more products may find their way into the "free" market.

4. He says that farmers also have cooperatives to handle the products in the "free" market. There are some consumer cooperatives, but he does not think they are very good. Prices in them are about like those in the "free" market and thus above those of the state stores.

We have a brief visit with Ambassador Thompson and after some general discussion leave about 11:50. We arrive at the Ministry of Agriculture about 12:15 p.m. for our first conference on the itinerary in the Soviet Union. Mr. Venables accompanies us.

3. On July 1 a new system for procuring agricultural supplies,

is supposed to have been put into effect. The Gosplan (the All-

Union Central Planning Agency) draws up procurement plans and

these go down through the various levels of the government. Presum-

ably they are based on the needs of the people. Compulsory deliveries

for whole farms are abolished. He doesn't think that this will make

much difference in procurement, but that farmers will now receive

higher prices in contrast to what they received formerly. Under the

old scheme the obligatory deliveries get rather low prices and

deliveries above that base get relatively higher prices. The new

prices are a compromise and in all cases equal to or above the old

prices for comparable deliveries. Then of course, out of this

increased income the farms must buy their own machinery and maintain

it. He thinks that possibly somewhat more products may find their

way into the "free" market.

4. He says that farmers also have cooperatives to handle the

products in the "free" market. There are some consumer cooperatives,

but he does not think they are very good. Prices in them are about

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general discussion leave about 11:50. We arrive at the Ministry of

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in the Soviet Union. Mr. Venables accompanies us.

We have a short speech by Mr. Askochinski, a vice-minister. He then turns to Mr. V. M. Melnikov who is to go with us on the tour. Also present is Mr. A. F. Kharchenko, Director of Scientific Operations for foreign countries. Several other Soviet officials whose names I am unable to get clearly are present. At this discussion I am introduced to our translator who is to be with us during the trip, Mr. Edward Baranov.

I have a very friendly discussion with the Vice-Minister about the whole plan. I want to be sure that everything is settled clearly in both Russian and English before we leave. I ask that most of the proposed visits to power stations, factories, and the like be eliminated so that we can concentrate on farms and research institutes. I present the Vice-Minister with a copy of our most recent yearbook on soils and open up the discussion of an exchange of agricultural films. He doesn't know what films they have available but will look into it and discuss them in detail on my return. So I shall leave the films in the Embassy for the present. The itinerary prepared by the Ministry follows:

July 18 Friday	Arrival in Moscow Accommodation in the hotel
July 19 Saturday	Conference in the Ministry of Agriculture of the USSR to discuss the program and the itinerary. Visit to the All-Union Agricultural Exhibition
July 20 Sunday	Sightseeing of Moscow. Excursion to the Kremlin
July 21 Monday	Visit to the All-Union Agricultural Academy of Agricultural Science. Visits to the Soils Institute of the USSR Academy of Sciences

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July 20	Sightseeing of Moscow. Excursion to the Kremlin
Sunday	
July 21	Visit to the All-Union Agricultural Academy of
Monday	Agricultural Science.
	Visits to the Soils Institute of the USSR
	Academy of Sciences

July 22 Tuesday	Visit to the Timiriazev Agricultural Academy. Visit to the Department of Pedology of the Moscow State University.
July 23 Wednesday	Leaving for Minsk (by air) Arrival in Minsk
July 24-26 Thursday Friday Saturday	Belorussian S.S.R. Visits to: Belorussian Institute of Melioration and Water Economy, Minsk experimental farm, Belorussian Institute for Projecting Water Economy and Hydro- technical Structures (Belgiprovodhoz). Drainage area "Sloust" Smolevitsk machine-melioration station, A collective farm.
July 26 Saturday	Leaving for Kiev by air at 12:55.
July 27 Sunday	Kiev region Visits to: Lenin collective farm, Dymersk district Irpensk drainage system The Exhibition of modern methods in people's economy of the Ukrainian S.S.R.
July 28 Monday	Departure to Poltava by car Visits to: Poltava region state experimental station Lenin collective farm, Poltavsk district, Poltavsk region.
July 29 Tuesday	Leaving for Dnepropetrovsk via Kharkov by car. Lunch in Kharkov. Arrival in Dnepropetrovsk. Visit to the glass house farm of the K. Libknecht plant.
July 30 Wednesday	Dnepropetrovsk region Visits to: Ordzhonikidze collective farm, Nikopolsk district Gorky collective farm, Nikopolsk district The state farm "Dneprovskii" Kamensk-Dneprovskii district, Zaporozhje region.
July 31 Thursday	Leaving Dnepropetrovsk for Rostov (by air) Arrival in Rostov.

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Leaving for Kiev by air at 12:25.	July 26 Saturday
Kiev region Visits to: Lenin collective farm, Dymersk district Irpensk drainage system The Exhibition of modern methods in people's economy of the Ukrainian S.S.R.	July 27 Sunday
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Leaving Dnepropetrovsk for Rostov (by air) Arrival in Rostov.	July 31 Thursday

August 1 Friday	Rostov region Visits to: The state farm "Koysugskii" Bataisk district The state farm "Krasnyi Sad" Bataisk district Lenin collective farm, Samarsk district
August 2 Saturday	Leaving Rostov for Krasnodar (by air) Arriving in Krasnodar
August 3 Sunday	Krasnodar territory Visits to: Experimental farm of the rice experimental station, Krasnoarmeisk district The rice state farm "Krasnoarmeiskii" Michurin collective farm.
August 4 Monday	Leaving Krasnodar for Stalingrad (by air) Arrival in Stalingrad.
August 5-6 Tuesday Wednesday	Stalingrad region Visits to: The state farm "Volgo-Don" Gorodistchensk district, Stalingrad Agricultural Institute Experimental farm of the All-Union Research Melioration Institute Stalingrad Hydro-Electric Station Shelterbelts.
August 7-13 Tuesday Wednesday	Arrival in Tashkent Uzbek S.S.R. Visits to: Tuja-Buguz Reservoir Middle Asia Research Irrigation Institute Farhad hydroelectric station Dzerzhinskii collective farm, Begovatsk district Tashkent region Farms in Golodnaya Steppe
August 13 Wednesday	Leaving Tashkent for Akmolinsk via Alma-Ata (by air) Arrival in Akmolinsk
August 14 Thursday	Akmolinsk region Visits to: Zhdanov collective farm, Shortandinsk district The collective farm "XVIII let Kazahstana" the same district. The state farm "Kazah Central Execut. Committee" the same district.

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August 15 Friday evening	Leaving Akmolinsk for Moscow (by air)
August 16 Saturday	Arrival in Moscow
August 17 Sunday	Visit to the Tretyakov Art Gallery Theatre in the evening
August 18 Monday	Conference in the Ministry of Agriculture of the U.S.S.R.
August 19 Tuesday	Free day
August 20 Wednesday	Leaving Moscow

(Added later: This was not followed exactly in all detail)

We have a preliminary discussion with representatives of Intourist. They will be prepared to discuss with us a little later the costs and conditions of alternative ways to carry out the itinerary that has just been agreed upon.

We go out to visit the famous agricultural fair. I notice many more automobiles in Moscow than when I was here in 1945. The streets are wide and clean. The city is much brighter than before, but still it is a bit drab, especially the shops. This is a beautiful day as we drive out to the fair.

This fair is a remarkable institution. There are many permanent buildings housing large functional exhibits and buildings for each of the 15 republics. It is beautifully landscaped with statues, fountains, and gardens. The whole development must have cost a great deal of money. We stop at a beautiful exhibit that shows in detail

August 12	Friday evening	Leaving Akmolinsk for Moscow (by air)
August 16	Saturday	Arrival in Moscow
August 17	Sunday	Visit to the Tretyakov Art Gallery Theatre in the evening
August 18	Monday	Conference in the Ministry of Agriculture of the U.S.S.R.
August 19	Tuesday	Free day
August 20	Wednesday	Leaving Moscow

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K-500c. July 10, 1959. Moscow. Exhibit of notes in the USSR at Venerichnaya 1911.

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the progress of water development and irrigation. (K-2509)

My guide tells me that one canal in the southern part of the country is used to irrigate 500,000 hectares.^{3/}

We are shown methods for taking the suspended materials from the river water. This is apparently a big problem since many of the rivers are rich in silt and fine sand because of the great amount of loess, even on mountain slopes.

We are shown many working models, including one in which the water pump for irrigation is on a boat on the river. This pump moves the water from the river into a basin just over its bank and from thence it flows by gravity to the fields.

I see beautiful exhibits and movies of the drainage work near Minsk. This exhibit shows open drains about 10 to 25 meters apart with mole drains between. They are using clay and wooden drains and also some made from glass and bitumin. They have some drainage with deep tile and then mole drains above the tile.

One can hardly resist taking pictures of these beautiful exhibits. I am particularly impressed with the exhibits for Uzbekistan. I am shown some samples of hybrid sorghum six meters high that is said to yield 120 tons per hectare!

^{3/} A table to help in the conversion of metric units to American units comes just at the end of the Journal.

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The main fountain is a gorgeous affair with 16 golden girls, one for each republic, clad in one of the principal local costumes. (Since the reorganization there are now only 15 republics but the fountain has 16 golden girls).

In the main hall I see a large soil map and monoliths of the principal soil types (using soil types here in the Russian sense of continental soil types). (K-2512). Officials of the fair give each of us a little badge and me a huge bronze medal.

Like the Brussels Fair one really should have a week at this gorgeous fair. I gather that state and collective farms from all over the Union send in products and compete for prizes. I gather too, that many farm people get as extra prizes for their work an opportunity to come to Moscow and visit this great exhibition. Certainly it is well patronized.

We go back to the U. S. Embassy for dinner chez Venables. As I sit down in his apartment I realize how tired I am, yet we saw but a tiny flash of the many functional exhibits and beautiful pavilions. Each one of these represents the style of architecture of some part of the Union.

We have a pleasant but slow buffet dinner. Finally I gather enough courage to get a car to take me back to the hotel around 10:30. Again I do my laundry, write some letters, fix up my cameras, and go to bed at the end of a pleasant day.

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K-2511. July 19, 1958. Moscow. View of central part of Agricultural Fair.



K-2512. July 19, 1958. Moscow. Soil map in main building.

K-2512. July 19, 1958. Moscow. Soil map in main building.

K-2511. July 19, 1958. Moscow. View of central part of Agricultural Fair.

July 10 (Sunday)



High class candy wrapper

July 20 (Sunday)

This is another warm sunny morning. After a slow breakfast our guides, Mr. Melnikov and Edward Baranov (hereafter referred to as Eddie), take us on a visit to the Kremlin. There is already an enormously long line waiting to enter the tomb and see the figures of Lenin and Stalin. We take a lot of pictures of the buildings and of the crowds. We get a good look at a famous museum in which are exhibited the clothing, coaches, uniforms, jewelry, and so on of former royalty and church leaders. We step into some of the cathedrals for a moment and then go out into the Red Square (K-2501) where we are taken through the line and into the tomb (K-2502). The place is well guarded, nobody says anything, and one must walk along briskly. I have a guilty feeling of breaking into this line ahead of people who have waited for many long hours, but Eddie says that this is normal procedure for a delegation.

We have lunch at the Moskva Hotel and then take a tour of the city with Mr. Melnikov as our host. We see the famous Bolshoi Opera House, which is now dark in summer.

We drive along the Moskva River and have a beautiful view of the great buildings within the Kremlin. We pass through a part of Gorki Park for "rest and culture." This is something like our recreational beaches and I suspect it would be very hard to get either rest or culture, although part of it has permanent gardens that are nice.

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July 20 (Sunday)



K-2497. July 20, 1958. Moscow
Some palaces in the Kremlin.



Cline, and Bonnan.

K-2498. July 20, 1958. Moscow.
Old cannon in Kremlin.

K-2727. July 20, 1958. Moscow.
Some palaces in the Kremlin.

K-2728. July 20, 1958. Moscow.
Old cannon in Kremlin.



K-2499. July 20, 1958. Moscow.
Old bell in the Kremlin.



K-2500. July 20, 1958. Moscow. Crowd waiting
to enter museum within the Kremlin.
Foreground: Bulik, Eddie, Malnikov,
Cline, and Donnan.

K-2499. July 20, 1958. Moscow.
Old bell in the Kremlin.

K-2500. July 20, 1958. Moscow. Crowd waiting
to enter museum within the Kremlin.
Foreground: Bulik, Eddie, Malnikov,
Cline, and Donnan.



K-2501. July 20, 1958. Moscow.
The Red Square.



K-2502. July 20, 1958. Moscow. View in
Red Square, with people lined up
to enter tomb of Lenin and Stalin.

K-2501. July 20, 1958. Moscow.
The Red Square.

K-2502

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K-2502. July 20, 1958. Moscow. View in
Red Square, with people lined up
to enter tomb of Lenin and Stalin.

We drive to a large apartment area. I suggest that I should like to see an apartment so they take me through an experimental area where they are trying many sorts of prefabricated building sections in trying to get the maximum of room, maximum of warmth in winter, and maximum of coolness in summer. I try some pictures and then go into a little flat that has a total area of 55 square meters for three rooms and a kitchen. I am told that the family pays 96 rubles a month, with heat, refrigeration, light, and gas. The rate is 58 rubles without heat and light. (Very roughly the exchange is 10 rubles for \$1, but since prices are controlled by the government some things, like rent, seem low whereas other things seem very high. The official exchange is 4 rubles for \$1, but this is purely artificial.) I am told that both parents work and that the husband gets 2,500 rubles per month and the wife 2,200 rubles a month. This figures out that rent is about 2 percent of salary, which would be very low in the United States. The income tax is 13 percent. So far as I could tell there were only one or two children in this family, but I noticed two old people. Families without children pay more rent than those with children.

We drive by the University of Moscow. The central building is huge and spectacular. (K-2640). It makes one think a bit of Rockefeller Center in New York City. The wings of the building are used as apartments for students. Besides this main building there are other buildings for physics, chemistry, soil science,

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and other departments. I am told that the University has 12,000 day students, 2,000 graduate students and 1,000 foreign students. Included in these figures are 2,000 foreign students from 100 countries, with, of course, special mention of the United States and other countries having close relations with the Soviet Union. I understand that some exchanges will be arranged between the

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K-2640. July 20, 1958. Moscow.
Part of the University of Moscow.

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K-2640. July 20, 1958. Moscow.
Part of the University of Moscow.

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By way of several points of interest we return to the hotel for dinner at 7:30. After a bit of chit chat I notice that some 29 Iowa farmers have just come into the hotel. We ask them whether they have been to the American Embassy. They reply, "No, it isn't on our program!" I strongly urge them to go to the Embassy and give them what I hope are sufficient reasons.

In the evening we can see fireworks from our window along with many searchlights in the sky. This day had been set aside to honor the Red Air Force. Soon to bed.

19
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July 21

This promises to be another bright and sunny day. Shortly after breakfast we leave for the Lenin Academy of Agricultural Sciences and reach there about 10:25.

This is the highest academy for agricultural science in the Union.

Our hosts include the following:

1. Sinyagin, I. I. - Head Scientific Secretary of the Presidium of the Academy. Professor, Doctor of Agricultural Sciences.
2. Sokolov, N. S. - Vice Academic-Secretary of the Agronomy Section. Professor.
3. Sotnikov, V. P. - Vice Chairman of the Council for Working Out Systems of Agronomy for the Zones of the Country. Candidate of Agricultural Sciences.
4. Frantsesson, V. A. - Vice Director of the All-Union Scientific-Research Institute of Fertilizers and Agro-Soils. Doctor of Agricultural Sciences.
5. Karpinskii, N. P. - Director of Laboratory of Soils of the Non-Black Soil Zones of the All-Union Scientific-Research Institute of Fertilizers and Agro-Soils. Professor, Doctor of Agricultural Sciences.
6. Mikhailov, N. N. - Director of the Section of Internal Relationships. Candidate of Agricultural Sciences.

They have about 900 professional research people and 100 advanced students working with them.

I am shown a map of the many institutes that they have in this Academy. A great many of these are organized around crops, although they also deal with soils and other agro-technical aspects of the production of crops. Thus there are institutes for sugarbeets, oil-bearing plants, shag and tobacco, flax, corn, fiber crops other

oil-bearing plants, shag and tobacco, flax, corn, fiber crops other production of crops. Thus there are institutes for sugarbeets, they also deal with soils and other agro-technical aspects of the Academy. A great many of these are organized around crops, although I am shown a map of the many institutes that they have in this advanced students working with them.

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July 21

than cotton, and many others. Each one also deals with soil amelioration, including fertilizers, and the like. The main institutes deal with the problems for the whole country. Besides the crop institutes there are others for cattle breeding, electrification, and the like.

Many of the republics have their own academies of agricultural sciences such as Ukrainia, Uzbekistan, Belorussia, Georgia, and Kazakhstan. At Minsk there is a special institute on water and swamp reclamation. At Tashkent there is a special one on irrigation. I am told that each of the academies in the republics differ somewhat from those in the others. A special council of the Lenin Academy here coordinates and guides the work of all the academies and helps outline the work for each academy including the cotton-growing research of Uzebekistan, irrigation research in Uzebekistan, drainage in Belorussia, and so on.

This Academy has 75 academicians and 75 corresponding members. In addition, there are some honorary members and 13 corresponding members from countries abroad. At the head of the Academy is a presidium consisting of 12 members elected for 5 years. This includes the president, 3 vice-presidents, a chief scientific section, and 6 members who are secretaries of the 6 sections as follows:

1. Agronomy
2. Animal husbandry, including veterinary science
3. Electrification and mechanization
4. Hydro-techniques and amelioration (Askochinski)
5. Forestry on farms, such as shelterbelts and the like
6. Economics and organization of farms.

than cotton, and many others. Each one also deals with soil amelioration, including fertilizers, and the like. The main institutes deal with the problems for the whole country. Besides the crop institutes there are others for cattle breeding, electrification, and the like.

Many of the republics have their own academies of agricultural sciences such as Ukraina, Uzbekistan, Belorussia, Georgia, and Kazakhstan. At Minsk there is a special institute on water and swamp reclamation. At Tashkent there is a special one on irrigation. I am told that each of the academies in the republics differ somewhat from those in the others. A special council of the Lenin Academy here coordinates and guides the work of all the academies and helps outline the work for each academy including the cotton-growing research of Uzbekistan, irrigation research in Uzbekistan, drainage in Belorussia, and so on.

This Academy has 75 academicians and 75 corresponding members. In addition, there are some honorary members and 13 corresponding members from countries abroad. At the head of the Academy is a presidium consisting of 12 members elected for 5 years. This includes the president, 3 vice-presidents, a chief scientific section, and 6 members who are secretaries of the 6 sections as follows:

1. Agronomy
2. Animal husbandry, including veterinary science
3. Electrification and mechanization
4. Hydro-techniques and amelioration (Askochinski)
5. Forestry on farms, such as shelterbelts and the like
6. Economics and organization of farms.

They explain that they have several publications and several scientific magazines. There is a general monthly magazine, an information bulletin on agricultural science, Agro-biology edited by Lysenko, and Pedology (Pochvovedenie) edited at the Dokuchaiev Institute. The libraries of the Academy make published summaries of all foreign papers. Besides they furnish material to the general academy on biology. These summaries come out twice monthly and contain abstracts of all scientific work in the world. The summaries are made by special technical institutes. In addition, the Ministry of Agriculture issues many publications. They now have about 40 agricultural magazines and several on biology. Then too, the republics publish their own agricultural journals. The Academy publishes many special bulletins and sponsors many books written by its members and staff.

During the last 3 years the budget for this Academy has increased 30 percent. The budget is defended each year before a special committee of the presidium of the Supreme Soviet, which is roughly comparable to our Congress. I ask the director what items he is giving special emphasis with his increased funds. His reply nearly throws me over: "We are emphasizing scientific work in genetics and plant breeding; you know we have been very backward in that field." (But it would have been worth his position to have said this before Stalin died while Lysenko had his great influence.) Some of their new increase will go into research on the use of isotopes in agriculture and they expect to emphasize research on soil erosion and drought prevention.

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I ask him to elaborate this last item a bit and he discusses research on how to increase water storage in the soil during the autumn and winter, including ways to keep snow in the fields. He also wonders whether they cannot improve the ability of soils to take in water from melting snow. Then they hope to make better use of summer rainfall through better varieties of crops and better timing of crop sowing. They expect to do more work on cultivation of clean fallow, including deep plowing without moldboards to not more than 30 centimeters.

We also discuss methods of cultivation that leave residues on those soils that are subject to blowing. Recently they have had some studies on the effects of organic chemicals on producing soil structure.

We are told that chemical weed killers are being used on corn, flax, and small grain and that they are being tried on vegetables.

We are also told that they have a special factory at Kiev for manufacturing superphosphate containing manganese.

We talk a bit about soil maps. He says that most soil maps for farm use are on scales of 1:1,000 to 1:10,000. (Added later: I saw only one map at 1:1,000, and that of an experimental farm) The work is said to be completed in several regions. (I think he means oblasts.) The detailed soil maps of state and collective farms are not published as such. It is said that each collective farm receives not only the basic soil map, but also agro-chemical

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maps, such as those showing amounts of available phosphorus in the soil, organic matter, potassium, pH, and the like. These maps are made by soil scientists and interpreted jointly with the local agronomists.

The agricultural administration of each oblast and of district or rayon office help in giving technical assistance to the collective farms. For some kinds of technical assistance, farmers need to reimburse the agricultural departments. Where the local departments or institutes lack qualified engineers or scientists they may have help from the ministries of agriculture in the republics. Where engineering practices are involved these men from the various administrations investigate the farm and make a plan. When this plan is satisfactory to the people on the farm the farm then applies to a special building organization to carry out any construction called for.

With drainage schemes, the government pays all costs; but 50 percent of these are later paid back by the farm. When new land is reclaimed, such as in the Hungry Steppe near Tashkent, the government pays all the initial cost. But the improvement of an existing irrigation system is paid partly by the government and partly by the farm. Where the farms pay, they may have credit and some 10 years before the loan must all be repaid. Ordinary land-leveling in old irrigated areas is also paid for by the government. Detailed arrangements and schemes vary in the different republics and even among the oblasts within a republic.

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I ask about demonstrations. The government gives neither fertilizer nor seed for demonstration but uses state farms and good collective farms for demonstration to the poorer farms. Sometimes an agricultural research institute demonstrates new practices on one or more collective farms.

We ask about their bacterial fertilizers. They have a special institute on these bacterial fertilizers in Leningrad. They supply mainly 3 types:

1. Cultures of nodule-forming bacteria (Rhizobium) that grow on the roots of legumes and are used for treating seeds.
2. Azotogen or Azotobacter cultures used for treating seeds. Apparently the effects are not fully understood. These are said to be effective in some cases and not in others. New investigations are underway.
3. Cultures of a phosphorus bacteria, called phospho-bacterin (Megatherium vipphosphatieum), are used to treat seeds where the soils are rich in organic matter in order to increase the amount of "moving phosphorus." The phospho-bacterin is used especially on the "virgin lands" in Siberia and northern Kazakhstan. The "virgin soils" are mostly Chestnuts and Chernozems rich in organic matter.

We are back to the hotel for lunch and then go out about 2:30 to the Dokuchaiev Institute of Soil Science, the highest authority on soil science in the Soviet Union.

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Here I meet Professor I. V. Tyurin, Professor Victor Kovda, and others of the Institute. I am glad to see that their building is being enlarged and remodeled so they will have some nearly appropriate space.

In the discussion of soil maps it is made clear that United States soil maps are made by the ministries of agriculture in each country. This system works well. In the USSR, soil maps are made under the general observation of the Union Ministry of Agriculture and accordingly

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This Institute now has 150 soil scientists in its different branches and 150 other technicians. Formerly the Institute was grouped with geology and geography but since 1950 it has been grouped with the biological section of the main academy (The Academy of Sciences of the USSR). Professor Gerassimov, who is now head of the Geographic Section of the Academy, was formerly a member of the Dokuchaiev Institute.

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3. An agro-chemistry section headed by Professor A. Sokolov. This section devotes attention mainly to soil fertility, improvements in the use of minerals, including lime. There are 18 persons.

4. Laboratory for soil mineralogy, headed by Professor N. Gorbunov. This has 17 persons.

5. Laboratory for biochemistry and microbiology in soils headed by Dr. Kononova. This has 15 persons.

6. A section on soil physics and technology, headed by Professor N. A. Kachinski, who also holds a chair at the University in soil physics. This has 15 persons.

7. Laboratory for physical chemistry for soil, headed by Antipov-Karataev. (When I was here before he was assistant director and I am told that he is now in the field overseeing shelterbelt work east of Stalingrad!) This section has 12 persons.

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12. Soil Biology, headed by Professor Tyurin. They are now studying nitrogen balance in soils. This section has 12 persons.

Professor Tyurin outlines the several series of publications released by the Institute, in addition to Pedology (Pochvovedenie), which is edited here:

1. General soil maps are issued for all the Soviet Union and for different parts of it.

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I am shown a detailed soil map of a farm. My time permits me to copy only a part of the legend, which is as follows:

1. Chernozem, leached, heavy loam.
2. Chernozem, weakly podzolized, heavy loam.
3. Chernozem, medium podzolized, heavy loam.
4. Chernozem, medium podzolized, with deposition of heavy loam.
5. Chernozem, gleyed, weakly podzolized, heavy loam.

I present Professor Tyurin with an example of our new detailed soil maps - the Ontario-Yates survey in New York. He gives Dr. Cline and me some soil maps, but not the very latest ones.

I visit the laboratory of Mr. Sokolov and he explains to us his work with "tagged" plant nutrients. He says that plants can extract nutrients from very saline soils at 16 atmospheres if part of the roots are in other pure water of say one atmosphere. If the upper layer is dry and not salty few nutrients are extracted. He has been working with P^{32} and Ca^{44} mainly.

We then go in to tea, with much wine, caviar, candy, and mighty little tea. We exchange gifts of books and maps. Altogether the session is very pleasant.

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July 22

I had a poor sleep last night from too big a day yesterday I suppose.

After a slow breakfast we pay for our tickets from Intourist - \$300 for airplanes and \$360 for 24 days of rooms and meals. I exchange \$50 at the bank for 500 rubles.

At 10:20 a.m. we are in the cars to visit the Timiryazev Agricultural Academy. Now there is a lot of traffic, about like Washington except for a higher percentage of trucks. Moscow now has very nice buses, some with electric motors and some with gasoline motors. We reach the Academy at 10:45.

We meet the director, G. M. Loza, and he and his staff tell us about the institution. Except for those graduating from universities, this is the highest agricultural institution in the USSR for agronomy, agricultural engineering, and the like. (Degrees in soil science, botany, and other subjects fundamental to agriculture are given only in the universities.) They have courses in general agronomy and in several special lines, such as, seeds, plant diseases, soil-agronomy, agro-chemistry, horticulture, animal husbandry, and agronomy-economics.

They have more than 3,500 students besides post graduates who hope to become teachers and professors. Many students come only in the winter months for the higher degrees, when enrollment reaches 4,000.

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This Academy is under the Ministry of Agriculture. They have here a land area of 1,750 acres with sections for agronomy, animal breeding, horse stables (studs), a dairy farm, a poultry plant, a piggery, and experimental forestry. Much of the forest was planted over 100 years ago. Then too, they have horticulture, dendrology, entomology, and phytopathology.

Besides the establishment here there are six large farms belonging to the Academy having a total of 14,000 hectares. These are operated like state farms. Three are in the Moskovskaya Oblast. One is in Yaroslav on the border between Podzol and Chernozem; one is in the Volga region on Chestnut soils; and one is on leached Chernozem. These farms include experimental plots and students have a tour of duty in at least one of them. In this way they combine experimental work with education.

The course for a diploma runs five years. Graduates are called "scientific agronomist with diploma." About 70 percent of the studies are in the laboratories and classrooms and 30 percent in practical and experimental work on farms.

Besides the 500 scientific workers in the Academy, including professors and experienced research workers, there are 500 technical assistants on the staff.

While students are successful in their examinations they are paid a stipend that begins at 300 rubles per month for first year students. Then the students with the highest grades receive a bonus of 25 percent more.

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We are told that many of the students in soil science and agronomy go into various government services. Many trained in agro-chemistry go to the big farms where fertilizers are important.

The teaching staff does some scientific soil research, especially on the podzolic soils of the Moscow region. The studies are directed mainly at soil genesis, ways to increase organic matter, and the use of mineral fertilizers.

The Academy publishes scientific papers and an Academy magazine. Then twice each year they have a technical conference. All these reports are published in short form in a "Doklady." Each paper is limited to 8 typed pages. More detailed reports, up to 25 typed pages, are published in the magazine. Most of the Doklady are exchanged and are rarely available in the bookshops.

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At the conclusion of this discussion, each of us is presented with the badge of a graduate of this Academy to be worn on the left side.

We are taken to the extensive soil museum and shown both virgin and cultivated profiles of the principal kinds of soil. I note several of these but cannot hope to get them all.

Tundra

Sod Podzol. This is a strong Podzol.

Soils from rocks rich in carbonate, including Rendzina, Sod carbonate, and Sod carbonate Podzol.

Alluvial soils

Peat soils

Many soils of the steppe and forest zone. The Gray-Forest soil here looks like a light-colored Chernozem. Their dark Gray-Forest soil I should have called a Chernozem: the surface layer is a bit gray and suggests a slightly degraded Chernozem.

They have a large collection of Chernozems including the following:

Leached Chernozem

Podzolic Chernozem

Meadow Chernozem

Thick Chernozem, A horizon more than one meter.

Ordinary Chernozem, good A₁ but less than one meter.

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Thick Chernozem, A horizon more than one meter. Ordinary Chernozem, good A₁ but less than one meter.

Southern Chernozem. This is a little grayer than I expected. Chernozem with Solonetz and Soloth.

The Gray-Forest soil is apparently more compact in the B horizon than in any of the Chernozem profiles.

Chestnut soils. (Dark, medium, and light.) This light Chestnut we should call a Brown soil.

Sierozem. This seems to include the brownish soils of the dry shrubby forest.

Cinnamon-colored soil of dry forest and shrubs on the border of the moderate and the sub-tropical climates. The soil is said to be calcareous in Bulgaria. In the United States it should perhaps be regarded as a calcareous variant of the old non-calcic Brown soils.

They next show us an exhibit of the farm where Dokuchaiev established the first shelterbelts. (K-2504)

We then go to the office of the Chief of the Soils-Agronomy Section. The late Professor Williams worked in this office and its laboratories for 55 years. They tell us about rotations on the Sod Podzol. This rotation, beginning with mixed clover and timothy, is outlined as follows:

1. Black fallow. Manure is added in the fall of black fallow and nitrogen, phosphorus, and potassium in the spring of the second year.

2. Winter wheat sown with perennial grasses, mainly clover and timothy.

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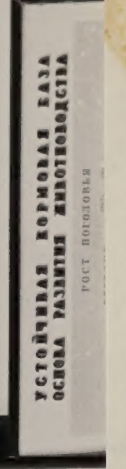
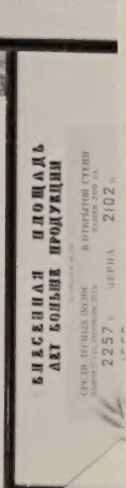
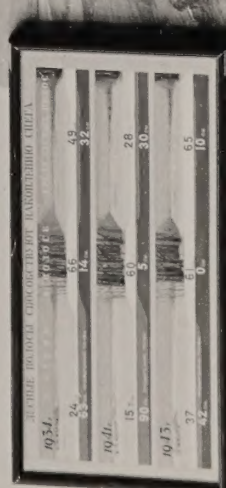
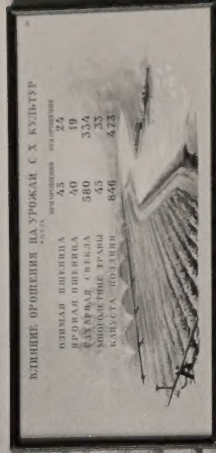
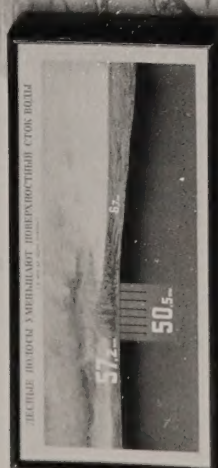
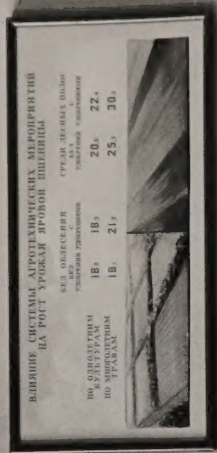
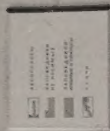
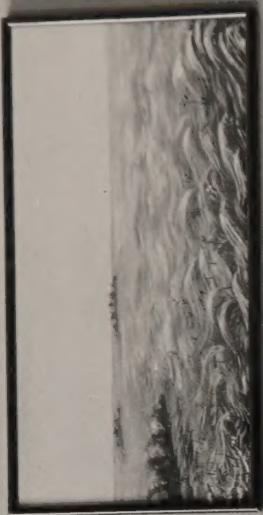
and timothy.

ИНСТИТУТ ЗЕМЛЕДЕЛИЯ ЦЕНТРАЛЬНО-ЧЕРНОЗЕМНОЙ ПОЛОСЫ, ИМЕНИ В.В. ДОКУЧАЕВА

ПОЧВЕННЫЙ ПОЯС:
ПРЕСЛАДНЫЙ ОБМАНОВЫЙ
ТЕЖЕЛОСУЩЕСТВЕННЫЕ ЧЕРНОЗЕМЫ

ГОЛОВЫ ОСАДИ
СРЕДНЕГОДА С
ПЕРВОЙ ЗАПЯТЫ

430 мм
5,2°
100 мм



ПРЕОБРАЗОВАНИЕ КАМЕННАЯ СТЕНЬ-
ГОРДОСТЬ СОВЕТСКОЙ АГРОНОМИЧЕСКОЙ НАУКИ,
ЗДЕСЬ ОСУЩЕСТВЛЕННЫ ЗАМЫСЛЫ
ВЛИЯНИИ РУССКИХ УЧЕНЫХ.

ВНЕШНЯЯ ПЛОЩАДЬ
АКТИВНОСТИ ПРОДУКЦИИ
2257 г. 2102 г.

УСТОЙЧИВАЯ КОММУНАЛЬНАЯ
ОСНОВА РАЗВИТИЯ АГРОНОМИЧЕСКОЙ
ПОСТ ПОДГОТОВКИ

К-2504. July 22, 1958. Moscow. At Timiryazev Academy. Farm where Dokuchaiev started research on shelterbelts.

on september 1948.

K-5204.

July 25, 1948.

Moscow.

At Leningrad Academy.

From where documents started to be taken

2509

3. Perennial grasses.
4. Perennial grasses and plow.
5. Spring wheat.
6. Potatoes. Potatoes get fertilizer and farm manure.
7. Barley or corn. Corn is fertilized in rows and used for silage.
8. Oats.

I ask about the use of lupines as a green manure in rotation with potatoes on sandy Podzols. They say the results are only fair.

Since the upper layer of soil is most rich in nutrients, they have tried plowing to about 45 or 50 centimeters in order to mix A₁, A₂, and B₂. Results have been fairly good with yields of winter wheat up to 4 tons per hectare.

We then go to the office formerly occupied by Professor Priianishnikov. This section does mostly teaching but has some research, especially on the problems of nitrogen-plant relations.

They now recommend fine grinding of raw rock phosphate without chemical treatment. This is used on podzolic soils and on leached Chernozem but not ordinary Chernozem. 80,000,000 hectares (I take this to be cropland) are suitable for using raw rock phosphate. Actually 1,000,000 tons were applied; but they claim not to know on what total area.

This section also works with soil micro-nutrients, lime, compost, and herbicides. They are continuing the work started by Professor Priianishnikov on the perennial lupine (Lupino polyfilis) for soil improvement, which he explained to me in Moscow in 1945.

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In this laboratory radio-active isotopes are used in research.

As usual we are in a big rush. As we leave with our books and medals at 1:30, the Director presents me with a bouquet of roses. (Although the other places had pictures of Krushchev, I saw none here but several of Stalin).

We are back to the hotel for a late lunch and leave for the University of Moscow at 3:15 p.m. We are met by Professor Victor Kovda, Professor Vilensky, and several others of the staff. The Department of Pedology (Soil Science) here occupies fine new quarters. Although the first course in soil science at the University was given in 1806, the first full course of lectures began in 1890. The first chair of soil science was officially established in 1921. Now there are six chairs in the Department of Soil Science.

1. General soil science. Professor Kovda. This section has 40 persons in it.

2. Geography and cartography. This section of 10 persons is headed by Professor Vilensky.

3. Soil physics. In charge is Professor Kachinski with 15 persons.

4. Soil biology. Professor Krasinilkov with 10 persons.

5. Agro-chemistry. Professor Avdonin with 12 people.

6. Agronomy with Professor _____ and 6 persons

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Besides excellent classrooms, museums, and laboratories for research and teaching they have experimental fields about 40 miles away and a forest biology station 70 miles from Moscow.

Annually they graduate from 40 to 50 students in soil science being trained mainly for research. Here they are expected to develop skilled scientists ready to go ahead with research. (This contrasts with the students of an institute who are not expected to do scientific research although some may develop along that line later.)

Students have basic science for the first two years and then theoretical soil science. Following that they are distributed among the six chairs according to the need for various skills. Between the second and third year they have their first field practice project. After the second year each student needs to have at least one experimental project. During the fourth and fifth years students have some elective courses given partly by outstanding soil scientists outside the University. Guests have come from Poland, Bulgaria, England, and China as well as the USSR. During the fifth year each student must do a considerable scientific thesis. The most talented of these are accepted immediately as aspirants for an advanced degree. They now have five of these and three foreign students.

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3. Soil aeration;
4. Methods for determining trace elements;
5. Biotoxins, especially in acid soils; and
6. Expeditions into virgin lands, cooperative with the Ministry of Agriculture.

Each April they have an annual meeting of the University. Each chair is obliged to select the best investigation of those of the students and professors to be presented. Four volumes of these are published by the University annually. In addition the Department of Soil Science publishes longer works. Short papers for important conferences are published in advance. Also monographs are published and the best work of the advanced students. Kovda praises highly the third edition (1950) of Vilensky's textbook on soils. The author gives me a copy.

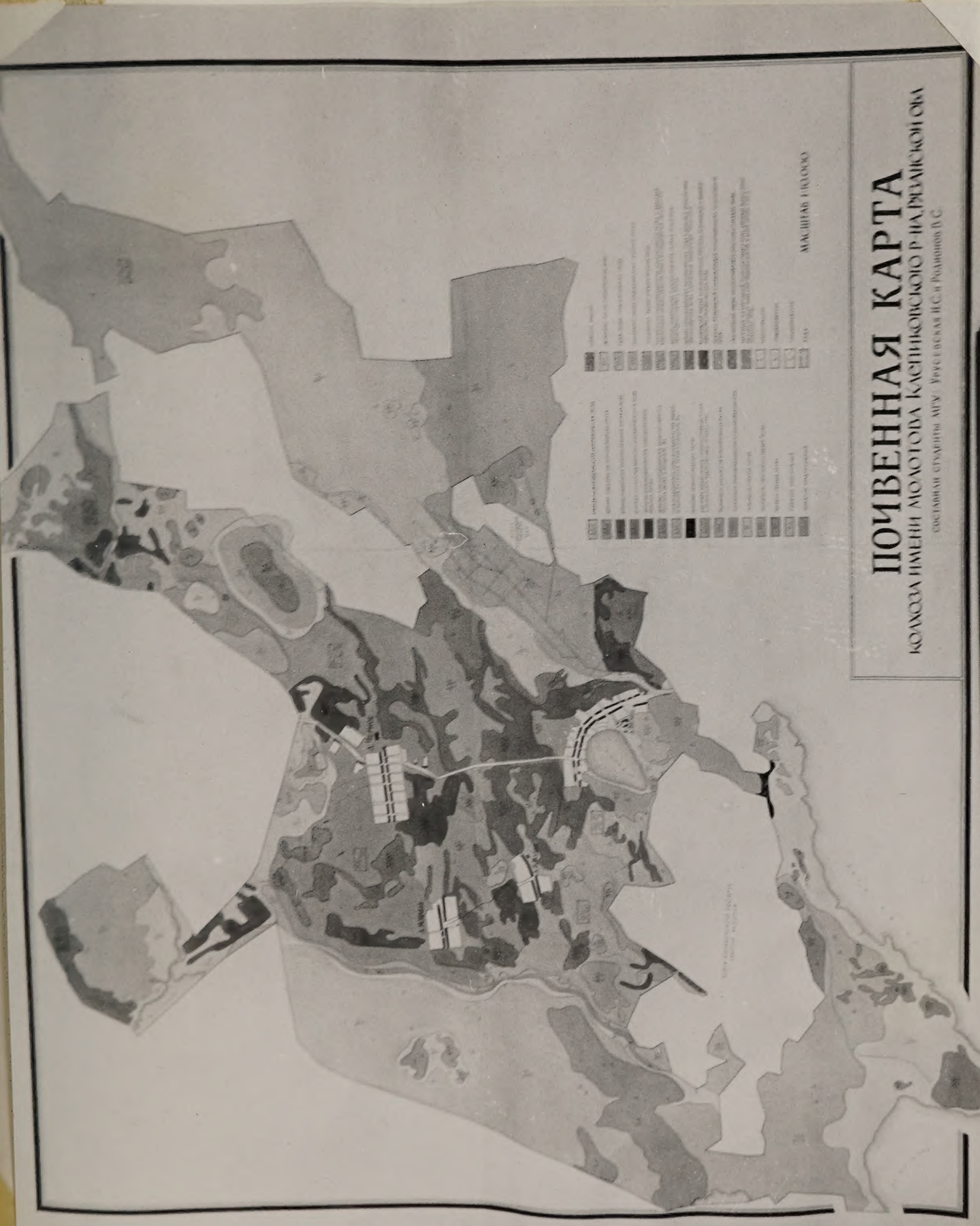
I take a rapid tour of the classrooms and laboratories. They have several very nice research rooms for two graduate students. I see excellent examples of the most up-to-date equipment for all phases of soil research and for teaching. I insist that Professor Kovda must be a personal friend of the Minister of Finance. Unhappily we lack time to visit the main soil museum near the very top of the central tower of the University. Still here near the classrooms they also have very nice exhibits of soil monoliths and accompanying vegetation, and even animals, along with soil maps. (K-2513, K-2514, K-2516) I have never seen a research and teaching institute for soil science anywhere that is so well equipped.

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ПОЧВЕННАЯ КАРТА

КОЛХОЗ ИМЕНИ МОЛОТОВА КАСИНСКОГО РАЙОНА РЯЗАНСКОЙ ОБЛ.

СОСТАВИЛ СТАНИСЛАВ АЛЕВ. ПРОЦЕССОР ИС. И РАЙОНОВ ИС.

K-2513. July 22, 1958. Moscow. At University of Moscow. Soil map of a collective farm.

K-521. July 55, 1958. Moscow. U.S. University of Moscow. 2011 map of a collective farm.

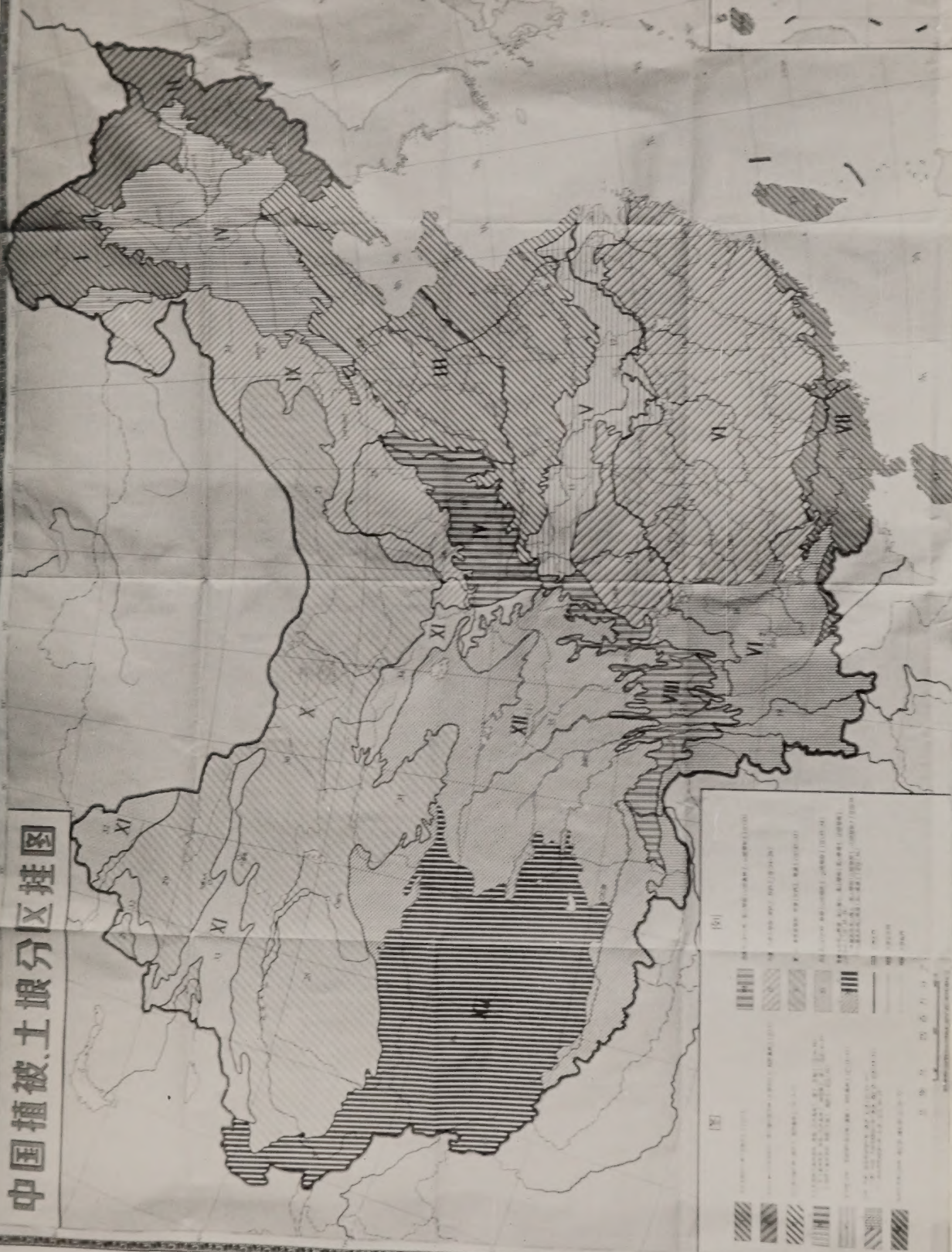


K-2514. July 22, 1958. Moscow. Soil monoliths for class work. Note vegetation and animals.

K-2514. July 22, 1928. Moscow. Soil monoliths for class
work. Note vegetation and animals.

ПОЧВЕННО-РАСТИТЕЛЬНАЯ КАРТА КИТАЯ

中国植被、土壤分区图



K-2516. July 22, 1958. Moscow. Soil map of China at University.

K-52-100 JULY 55, 1928. MOSCOW. 2011 WEB OF CYPRUS ST UNIVERSITY.

Professor Kovda invites Mr. Bulik and us to his apartment

for dinner. As soon as we get back to the hotel we have put

tickets for the courier. These mysteriously are a bit.



July 22, 1958. With Professor Victor Kovda (R) at the University of Moscow. (Photo by Bulik).

He asks us about the possibility of soil scientists from the

China coming to the Congress of the International Society of Soil

Science in Madison, Wisconsin in 1960. I tell him that I know

that this will be possible but I do not know. He is so eager to

an official letter of inquiry.

July 22, 1958. With Professor Victor Kovda (R) at the University
of Moscow. (Photo by Bulik).

Professor Kovda invites Mr. Bulik and me to his apartment for dinner. As soon as we get back to the hotel we have our tickets from Intourist. These mystify me a bit.

I prepare myself in a hurry as Professor Kovda and his wife are coming for us at 8:00. We need to wait for them. They come late at 8:25 and Kovda says that their apartment is not prepared to receive us! He says, "So we can have a pleasant dinner in the hotel." Obviously something changed his mind about having us come to his home. We do have a pleasant dinner while the others go to a puppet show. Kovda asks me to give a lecture in the University when I return from the field trip. We talk of the exchanges of persons and I stress workers and farmers as well as scientists. He expresses some irritation because he couldn't travel freely in California last year. I explain rather forcibly, what I am sure he already knows, that it was wholly because the Soviet Government would not at that time allow American engineers and scientists to visit freely in the Soviet Union.

Today we had given Professor Kovda many books and a modern tensiometer. He was obviously very pleased. This evening I give Mrs. Kovda a pair of nylon stockings. They both plan to go to China soon.

He asks me about the possibility of soil scientists from Red China coming to the Congress of the International Society of Soil Science in Madison, Wisconsin in 1960. I tell him that I doubt that this will be possible but I do not know. He is to write me an official letter of inquiry.

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visit freely in the Soviet Union.

Today we had given Professor Kovda many books and a notebook

containing. It was obviously very pleasant. This morning I gave

him, too, a box of notes and letters. They have time to go to

China now.

He says he about the possibility of some relationship with the

Chinese coming to the Congress at the International Institute of

Science in Moscow. He says he is sure. I tell him that I know

that this will be possible and I do not know. He is sure

an official letter of inquiry.

July 23

We are up at 6:30 to pack some things for leaving at the American Embassy while we are on our field trip. One never knows what to take on a trip like this into "new" country.

Last evening Kovda told me that the Timiryazev is out of date and continues in the same way as 30 years ago. Certainly there is great overlapping of research activities among the many institutes. In soils, each one begins, however, with a full statement and background of the great soil groups and subgroups. All have numerous soil monoliths, along with pictures of the associated landscapes, and examples of the plants and animals in the soil. So far as I can tell, the whole system is highly classical and rigid as of about 1920 or 1930, except for relatively minor additions on classical names to have names of local kinds of soil on detailed soil maps.

After breakfast we meet the people from the Ministry of Agriculture and our passports are returned to us with proper visas. Bulik and I take the extra materials to the Embassy. He remains there while the rest of us go to the Institute of Fertilizers and Agro-chemistry, which comes under the Lenin Academy of Agricultural Sciences. Our hosts include:

1. Professor Frantsesson, V. A. - Vice-Director of the Scientific Section. He is also Director of the Laboratory of the Chernozem Soils.
2. Academician Kedrov-Eikhman, O. K. - Director of the Laboratory for Liming Acid Soils and Isotopes.
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5. Candidate of Agricultural Sciences Mamchenkov, I. P. - Director of the Laboratory of Organic Fertilizers.
6. Rodionov, Ya. E. - Scientific Secretary of the Institute.

We meet in the office of the Vice-Director and he tells us about their facilities and work program.

1. One soil laboratory studies the problems of fertility of podzolic soils. Methods are developed for making agro-chemical maps. The work involves the associated marshy soils as well as mineral soils. They show us large maps of state and collective farms as examples. They make the agro-chemical maps only to develop principles. Local organizations carry on most of the work.

2. Laboratory studies of Chernozem soils. During the last few years special attention has been given to the virgin soils of the new lands in respect to fertility and changes in fertility and other qualities with cultivation. They are attempting to develop methods for better use and cultivation of these soils in northern Kazakhstan and western Siberia. We are told here that 35.5 million hectares were reclaimed from 1954 to 1956. They hope to find a basis for better tillage methods. Soil structure is being studied but they have not tackled the problem of fertilizer use. Studies are carried out by expeditions into these areas.

3. A laboratory for the soils of dry steppes and deserts studies methods of amelioration of Solonetz, such as with gypsum but mainly with special plowing. The depth of this special plowing varies in accordance with the amount of gypsum to be worked into the surface

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4. A laboratory on methods for agro-chemical analyses seeks quick methods for use in local areas.

5. In a special laboratory for soil tillage they study changes in the different layers of plowed soils, "to prove scientifically methods of tillage." This laboratory is some 60 km. from Moscow. Other experimental farms are far from Moscow.

6. There is a laboratory for systems of fertilizer use and crop rotations with a network of experiments at some 100 stations under the Ministry of Agriculture and the guidance of this Institute, which plans the work and interprets the results. These results are used for making recommendations to the government about fertilizers for industrial crops. The Vice-Director gives me a book summarizing these recommendations. Twice each year a general session is held for discussing the results of the work.

7. A mineral fertilizer laboratory studies new forms of mineral fertilizers manufactured by industry. Several promising ones include melted deflorinated apatite, liquid ammonia, and new forms of urea. Metaphosphate was found to be good but is not yet manufactured in the USSR.

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9. In a laboratory on soil liming they study leaching in acid podzolic soils and seek to find the proper amounts of lime to apply and methods of application. They deal also with theoretical problems of forms of soil acidity and effects on plants. This laboratory deals also with the micro-nutrients, especially cobalt, magnesium, manganese, and boron. They have some sulphur deficiency in clover on podzolic soils, but since they use superphosphate the plants get enough sulphur. (This is inconsistent with recommendations for raw rock phosphate on podzolic soils.) We are told that finely ground apatite is not used but that large amounts of rock phosphate are used. They emphasize that biometrical analyses of the experiments are made and that the number of replications depends on the complexity of the soils.

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12. A micro-biological laboratory studies the role of micro-organisms in plant nutrition and includes experiments under sterile conditions.

13. The Institute includes a Department of Economics to study relative costs and returns.

14. There is a laboratory for chemical weed control.

The Institute has an experimental station near Moscow and one for sandy soils in the Bryansk region, which is mainly for studying green manuring. Close relations are maintained with the stations of the Lenin Academy and with the Ministry. At this center there are about 200 on the professional staff. We are given several recent books that may well be worth translating.

We then take a rapid tour of some of the laboratories.

The fixation of phosphorus in soils and its uptake by plants is similar to the work carried out by Dr. Lyman Dean of the United States. Methods of using ion-exchange resins are something like those of Dr. C. A. Black of Iowa. They emphasize the quantity versus the intensity factor. Their use of the term "phosphate level" is similar to Dr. Scofield's "phosphate potential." They use a photo-electric colorimeter for tracing phosphorus. They now have a new method for measuring concentrations of phosphorus in water and salt solutions as low as .01 milligrams per litre. They evaporate under infra-red lamps. Organic phosphate is determined by oxidation with hydrogen peroxide.

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We are shown maps of a collective farm in the Moskovskaya Oblast made in 1950. Recommendations from this work are now said to be in practice. The farm has 67,000 acres, of which 45,000 are plowed.

(a) Basic soil map showing:

1. Sod Podzol with heavy clay loam on:

- i. Third terraces
- ii. Second terraces
- iii. First terraces

2. Ancient alluvial soil - Sod Podzol that was gleyed and is now drained.

3. Sandy Sod Podzol on first terrace from alluvium.

(The Sod Podzols are subdivided into phases for slight erosion and for temporary excess wetness.)

(The main soil types on this farm are apparently at the level of our soil series.)

(b) Map of rotations, now said to be in practice. Field boundaries follow the main lines on the soil map. It appears that the drains for wet soils are mainly open ditches at 100 to 200 meters.

(c) Map of pH of plowed soil. (pH of salt extraction in 1N KCl). This map corresponds only partly with the soil map because of differences in former use. If the recommendations have been followed most of the map is out of date.

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(d) Map of available phosphorus using unbuffered .2N HCl for extraction. They do not use buffers for podzolic soils. The location of the individual plots and livestock barns are clearly obvious.

(e) We see another soil map of phases according to available phosphorus.

We are told that all collective farms in the Moskovskaya Oblast have these large-scale maps. Now they are doing the state farms. We are told that these are made at no cost to the farms.

Sometimes they make maps of available potassium; but not of nitrogen, except to tackle a problem of micro-nutrients. They have some cobalt deficiency among cattle. They have deficiencies of molybdenum but only a few cases of excess.

Analyses are made here only for demonstration purposes. Each oblast has its own laboratory and I gather that some rayons do also.

They tell us that they are studying the mixing of ground rock phosphate with acid peat and manure to make compost in which the phosphate is more available to plants. Mono-valent cation humates make the ground rock phosphate more soluble. At least three months is required on collective farms for making this compost of peat and manure. Formerly it was not turned but now they have special machines for the purpose. They did not find the artificial manure made from straw, nitrogen, and phosphorus of economic benefit. Only the most advanced collective farms use good compost. Where much peat is used, KCl is added to the compost, partly to help control denitrification.

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Sawdust is used for litter in stables and thus in compost. It is used as a mulch for strawberries and some other crops along with mineral fertilizers.

They have alkaloid-free lupines that are cut for silage just before flowering. The second growth is plowed down in the autumn.

On some farms clover is sown after the spring cereal. The next year after the cereal harvest, the clover is taken in June and the soil is plowed and sown to a winter crop.

As with us, now that more chemical nitrogen is used, yields are higher and there is a heavier stubble to plow down.

As low as one milligram of certain humates per one kilogram of soil produces considerable growth. So does the application of liquid ammonia to peat compost.

The laboratory for isotopes started in 1951 with radioactive cobalt, calcium, phosphorus, and sulphur. Now the main emphasis is on strontium 90. They are studying its effects on both seeds and vegetation.

It is too bad we have so little time. At 1:30 we leave for the Embassy and then the hotel. We have a slow lunch which includes the final settlement of our food bill.

We finish packing and go down for tea. The cars come and we leave the hotel at 5:50 p.m. At 6:30 we weigh in at the airport and are soon called to board our plane. The wheels leave the ground for Minsk at 7:41 p.m.

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At first the land is undulating to gently rolling. Perhaps one-third of the cover is forest with small trees. The rest is mainly small grain, hay, pasture, and fallow. I see several small streams, ponds, and wet swampy places.

Houses in the villages are spread out so that each has a considerable plot, perhaps one to two acres. Other houses are fairly close together along the road with longish narrow strips back of them.

The air is hazy. Out 10 minutes I see some rather large areas of forest. Much of the soil is wettish.

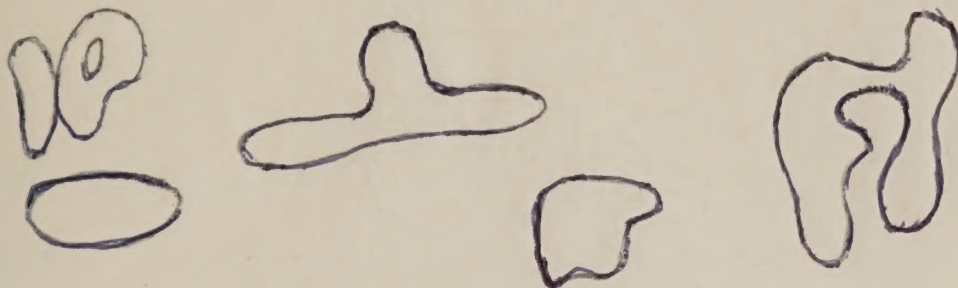
I see a curious installation having several small, low, solid buildings with large concrete roads leading to them. It is hard to follow the map. I see heavy forest, then areas with about one-third forest, and some more heavy forest of small trees. There is much soil here that could be improved by drainage.

At 8:13 the plane goes up to 1,900 meters and I can hardly see more than the general pattern of land use.

I note a curious variety of awkwardly shaped fields, near and within the forest. Then too, farm work goes around tiny elliptical objects in some fields. (War relicts?) Already I have seen a variety of village patterns and various sizes of home allotments. Around some of the villages there is a very complicated pattern of winding roads.

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Twilight comes and it is hard to see except for more of these curiously shaped fields of 3 to 20 acres.



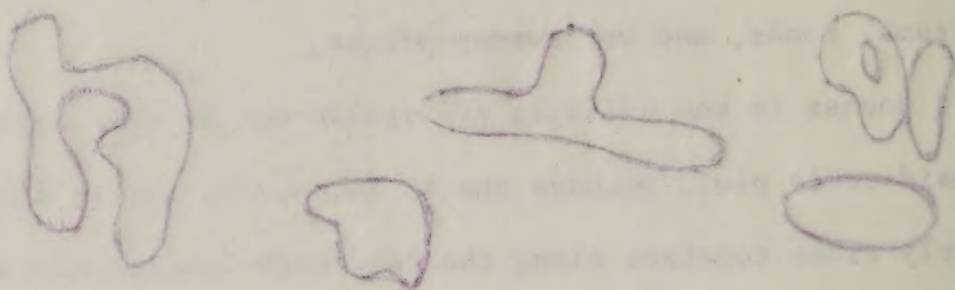
Near Smolensk there is somewhat more cropland but also considerable forest. At 9:00 we pass the rail line south of Vitebsk. Here about one-half is cultivated and I see more of these curious fields. Yet the local plots of members of the collective farms are rectangular strips with square corners.

About 20 miles from Minsk the cover is about one-half forest and more normally shaped fields. I see a few lakes.

We are down at Minsk at 10:10. We are met by Professor Lupinovich, President of the Academy of Agricultural Sciences for Belorussia. He is a soil scientist highly recommended by Professor Kovda. He and other members of the delegation first take us on a brief tour of the city. I am far too tired to appreciate this. Finally we are taken to our hotel - the Belorussia. Then we have a slow dinner and one day passes to another as we finish.

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July 24

It rains this morning. Although this is a new hotel, it is not very well appointed. Curiously, the shower is directly over the wash basin. Most of this city is new except for the main government building of the Belorussian Republic. The Germans had placed 17 tons of explosives in it but for some reason the charge failed to explode. Nearly all the other buildings were completely destroyed and have been replaced.

We go to the Ministry of Agriculture with the president of the Academy of Agricultural Sciences and others. He points out that not only was the city destroyed but also nearly all the farm buildings. Some of those made immediately after the war were temporary and need replacement.

The Minister, Mikhail Nikolaevich Lutsenko, says that he thinks we shall learn very much during our trip and that his staff has learned a good deal from earlier delegations. He says that he is eager for mutual exchanges of ideas and that these can only be helpful to both countries.

We discuss our plans for the stay in Minsk including drainage research and visits to collective farms. Most time will be spent at the Amelioration Institute. The director is Stepan Gordeevich Skoropanov.

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We are told that agriculture is the most important branch of economy in the Belorussian Republic. It has never been considered an important grain-producing area. Now cattle breeding, pig production, dairying, and fiber flax are most important. We are told that the income of the collective farms is now roughly one-third from fiber flax. Also, hemp is grown on a large scale in marshy areas. Potatoes for human food and for animal feed is the leading crop in the Republic, about 1 million hectares. The farmers know well how to grow potatoes. Average yields are about 10 tons per hectare, but the best farms get 18 to 20 tons. With them sugarbeets is a relatively new crop. They are trying to increase the acreage and are building some new beet-sugar factories.

Their plans call for bringing an additional 1.5 million hectares of marshy land in Polesseye Oblast of Belorussia into use through drainage. Most of this is peat on which they expect to grow sugarbeets, hemp, flax, and especially animal feed. They claim to get 40 tons of sugarbeets on peat soils some 120 to 150 centimeters deep. They also grow vegetables for city use and some green corn for silage.

A large part of the potato crop is used for alcohol. Now some state farms have factories for making alcohol.

They emphasize that on new land they can make collective farms of optimum size. (I do not get a clear idea of what this size is.) Part of the new land is allotted to state farms and part to collective farms.

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Much of this undrained land has been used for pasture and following reclamation the collective farms simply expand their total business. A few years ago 95 percent of the cropland belonged to the collectives; now the figure is 89 percent. I ask how the land gets transferred from the collective farms to state farms. The reply is not entirely clear. It is said that many collective farms have great areas of marshy lands and could not develop all the area despite the fact that the government pays 50 percent of the cost. Thus, it is said, that the collective farms themselves apply to the government to take the extra land for state farms. (If I know farm people at all, this takes some outside urging!)

The Republic has 3,912 collective farms and 144 state farms. I am told that the size of the collective farms varies widely. Of course, in Siberia and in northern Kazakhstan farms have several thousand hectares, but here the optimum size falls between 1,800 and 2,500 hectares with 180 to 200 families per farm. It is said that on good soils the family plots vary from .2 to .3 hectares. If these lands are wet they are drained for the families as a part of the drainage scheme. The large canals are built entirely at the expense of the government. The auxiliary canals and the tile drainage are paid for one-half by the government and one-half by the farms, except that the wealthy farms are expected to pay all the cost of the tile drainage. The government also pays one-half the cost of topographic surveys, stump removal, and land leveling.

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The Republic has 3,912 collective farms and 144 state farms.

I am told that the size of the collective farms varies widely.

Of course, in Siberia and in northern Kazakhstan farms have several

thousand hectares, but here the optimum size falls between 1,800 and

2,500 hectares with 180 to 200 families per farm. It is said that

on good soils the family plots vary from 2 to 3 hectares. If these

lands are wet they are drained for the families as a part of the

drainage scheme. The large canals are built entirely at the expense

of the government. The auxiliary canals and the tile drainage are

paid for one-half by the government and one-half by the farms, except

that the wealthy farms are expected to pay all the cost of the tile

drainage. The government also pays one-half the cost of topographic

surveys, stump removal, and land leveling.

The crops on the family plots are mainly potatoes, vegetables, orchard fruits, and some fodder for animals. One family commonly has its own pig and cow. Those near the city sell some of their vegetables in the city free or farmers' market.

The income of the collective farmer depends upon the number of work days. He is paid partly in kind, including some animal feed, and partly in cash. As a rule, most farms have a common pasture for the individual cows apart from other pastures.

I try to get some idea of the income of a family on a collective farm. Of course the standard work day is a rather theoretical concept. The number received for one 8-hour shift depends on the skill required for this job. The least skilful workers on a farm get 75 percent of a labor-day unit for an 8-hour shift while the most skilful workers get 3 units for one 8-hour shift. I am told that the head of a family would have around 320 to 350 work days and that other members of the family might have around 170 to 180 all together. Thus it is said that one farm family might have 500 to 550 work-day units annually. On the average, one work-day unit might be worth 7 rubles in cash plus 1.5 kilos of grain, 3 kilos of potatoes, 200 to 250 grams of hay, and some vegetables.

On the Dawning Collective Farm with 1,200 families and 7,000 hectares, the farm itself received 18 million rubles. This is an outstanding farm and paid 25 rubles for each labor day plus about 2 kilos of grain and other materials accordingly. By converting all this to cash the income amounts to about 1,000 rubles per month per family.

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A collective farmer pays a small tax for his plot and house, which is said to amount to about 3 to 5 percent of his income.

The Minister discusses the sending of Soviet farm people to the United States. He says that he wants them to have an opportunity to work on American farms.

At 10:35 we go to the Belorussian Scientific Research Institute of Amelioration and Water Utilization. Director S. Skoropanov, tells us about its history and work. The Institute arose from an expansion and extension of an older Minsk institute for swamp reclamation.

The Institute studies the marshy lands of which there are about 7 million hectares or about one-third of the land in the Republic. They study the different kinds of soil and especially how to drain the wet soils. Part of the drainage is done by the engineers from the Institute. They also recognize the problem of developing theoretical methods for the drainage and management of the marshy lands.

The Institute is divided into a total of 13 sections for handling various aspects of this big problem. They have sections on soils, amelioration, agronomy, and so on. The professional staff here is about 150 of whom 45 percent are engineers. At the moment they are short of space and many of the laboratories are in the other buildings. In two years they expect to have a large new building.

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In two years they expect to have a large new building.

Besides laboratories, they have experimental fields, including a large experimental station near Minsk. That farm is already too small. They have another station near Kosovskaya about 250 kilometers from Minsk. There they have 650 hectares under drainage experiments. A third station and center is being made in the Polesekya Valley. They will have 8,000 hectares of nearly level land for this station. Reclamation by drainage is just being started. They plan to carry out large-scale drainage at this place, which is some 300 kilometers from Minsk.

We take a quick look at the laboratories. They begin with the soil map. There are lowlands in the south of the Republic, old marine deposits in the central part, and marshy land in the north. The area was said to have been glaciated 3 times but the last one covered only the northern part. The highest areas have a covering of loess. Rainfall is highest in the northwest, about 500 to 600 millimeters; and it drops down to 450 millimeters in the south. The absolute minimum temperature at Minsk is about -37° centigrade.

Originally the cover was forest and marshy moors. The northern part had fir trees and mixed forest. There is some fir near Minsk, but not in the south. The sandy soils of the north have pine and spruce but there are more deciduous trees in the south. Much land now remains in forest, especially in the southern part of the Republic.

I attempt to copy down the scheme for soil classification; but this is so time consuming that they give me a copy for insertion in my notes.

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SCHEME OF SOIL CLASSIFICATION AND CONVENTIONAL SYMBOLS							
FOR LARGE SCALE MAPPING							
No.	Conventional Symbol	Type	Subtype	Kind	Form	Variety	
	Colours and Signs	According to soil formation process and structure	According to degree to which basic processes of soil formation are expressed	According to mechanical structure of soil parent	According to soil forming parent	According to character of transformation of soil under the influence of natural processes	
		I. SODDY	A. Leached	1. On clays	Underlain with lime, chalk, loam and peat tuff. (noted in description or by additional symbols.)		
			B. Podsol Carbonates (shown additionally under "A")	2. On loams			
				3. On loamy light sand			
				4. On sands.			
		II. SODDY PODSOL	1. Slightly podsol	On clays: a) pulverized			
			2. Medium podsol				
		"	3. Strongly podsol	b) sandy (In all cases stony structure is described by additional symbols).			
			"	1. Slightly podsol			On loam: a) pulverized
		2. Medium podsol					
		"	3. Strongly podsol	b) sandy			
			"	1. Slightly and medium podsol			On loamy light sand: a) pulverized
		2. Strongly podsol		b) sandy			
		"	1. Slightly and medium podsol	On sand: a) pulverized b) medium and small grain types.			Thick, underlain by sand, moraine loam, lake clay etc. (see additional symbols)
2. Strongly podsol							
III	SODDY PODSOL BOGGY SOILS	1. With traces of temporary bogging	Shown in colours accepted for soddy-podsol soils: a) on clays b) on loams c) loamy light sand c) sands.	Virgin soils (under forest) (abandoned, cultivated (slightly, medium, heavily) lime fertilized. Reclaimed. (Degree of cultivation with the exception of vegetable gardens are shown in the diagram).			
2. With gley spots (gleyey)							
3. With gley horizon (gley)							
4. With eluvial-humus horizon							
A. Podsol and soddy-podsol							
B. Humus							
IV		SODDY BOG SOILS			1. With traces of temporary bogging	Shown by the same colours as soddy soils: a) on clays b) on loams c) on loamy light sand d) on sands	
	2. With gley spots (gleyey)						
	3. With gley horizon (gley)						
	Shown by the same symbols as podsol bog soils on soddy soil background (see I-1,2,3,4)						
	4A. Humus-gleyey						
	4B. Humus-gley Carbonate (shown by additional symbol)						
	V		PEAT-BOG SOILS	A. Peatygley	On grass-sedge, sedge, horse-tails, reed, alder, sphagnum, etc. peats. (Noted in description or by additional symbols accepted in bog science).		
				Thickness of peat to 50 cm.			
				B. Peat gley (thickness of peat to 1 m.)			
				C. Peat more than 1 m. (Thin: up to 2 m.; medium: up to 3 m.; thick: over 3 m.) Thickness of peat is shown by figure on the contour).			
VI	FLOOD LANDS (Alluvial) SODDY	a) Leached b) Podsol	1. On alluvial clay				
		The symbols for III and IV - 2, 3, are the same as for gleyey and gley, i.e. by a blue interrupted or uninterrupted line. Carbonates (described by an additional symbol a).	2. On alluvial loam				
VII	FLOOD LANDS (Alluvial) BOGGY		1. Silt-bog carbonates (Shown by additional symbols) and leached (can be described in the same way as a) and b).	3. On alluvial loamy light sand.			
				4. On sands			
				a) On alluvial clay			
				b) On alluvial loam			
				c) On alluvial loamy light sands			
				d) On sand.			
				2. a) Peat-boggy- thickness of peat up to 30 cm.	On grass-sedge, sedge, reed, horse-tail, alder and other peats are marked as for peat bog soils. See V - 1, 2, 3.		
				b) Peat bog - thickness of peat up to 1 m.			
				c) Peat - thickness of peat more 1 meter.			

ADDITIONAL SYMBOLS

Additional symbols show: underlain with moraine, underlain by lake clay, underlain by sand, boulders and stones on the surface of the soil, eroded soils, shifting sands, deposits of minerals, deposits of vivianite in peats, deposits of ochre and iron ore, carbonates.

They show me some dark-brown peat with grass peat to about 2 meters. They maintain that a fluctuating ground water brings minerals to the surface in this peat. They show me samples of high moor with sphagnum peat from the north-central part of the Republic. They say that about 11 or 12 percent of the 7 million hectares of peat are of this type, which runs about 14 meters thick. They say that the building-up process in the center is not much more than one meter. Of course such peats are not reclaimed but are used for fuel.

It is said that each oblast has an institute including a department for soil science and agro-chemistry to investigate each collective farm under the general guidance of this Institute. Soil maps of farms are made on a scale of 1:10,000.

Starting with these basic soil maps and with laboratory tests, maps are made showing available phosphorus, calcium, potassium, humus, and pH. With these maps they work out a plan for drainage and other treatments of the fields, including crop rotations.

I am promised that I may have one of these soil maps. (Added later: One was given to the last of our men to leave and I shall try to send an example of one of ours to them.)

They study the genesis of the soils, their mineral and biological properties under natural conditions, and how these properties change with amelioration and fertilizer use. They have found out that many of the soils change very greatly with increased aeration. Biological activity is greatly stepped up along with the decomposition of the

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organic matter and the release of minerals. Then new processes appear. In organic soils with 15 percent mineral matter, nitrification is low in relation to ammonification. After drainage, nitrification goes on at full speed. The soil may have around 4 percent nitrogen but is commonly low in phosphorus, say 0.2 to 0.3 percent. Potassium may be as low as 0.01 percent.

In the physical chemical laboratory they work on the problem of absorption of phosphorus ions in peaty and clayey soils. They are also studying the content of micro-nutrients in Sod Podzols and peat soils. They are using radioactive phosphorus and they have concluded that the absorption of phosphorus ions by both peat and clay is mainly a surface phenomenon. Exchanges between the solution and the soil are mainly surface reactions.

The absorbed phosphorus ions are gradually converted with the aging of the drained soil. Aluminum is particularly important in the sod-podzolic surface layer, and iron is more important in the B horizon. They find that the amounts of the other ions, such as zinc, manganese, cobalt, and copper, depend a great deal on the parent material. They have widespread deficiencies of cobalt and copper in the peat soils.

We take a look in the laboratory for hydro-technical amelioration. The problems of this laboratory include:

- (1) Surveying and calculation of the drainage needs.
- (2) Methods of marshland reclamation, including:
 - a. Methods of calculating drainage systems;
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- c. Norms of swamp drainage;
- d. Intensity of evaporation in swamps;
- e. The depth of water to remove from peat; and
- f. Coefficient of infiltration.

They show us how they calculate the water levels in the rivers in order to plan their drainage so that the maximum deliveries of water will not exceed what the streams can take care of. These maxima and minima for drainage are essential to proper design in relation to existing streams.

They emphasize the importance of early sowing on their reclaimed marshy soils. Generally they say that if grain sowing is late, the yields are reduced 100 kilograms per hectare for each day that it is late. For this reason the plan must take into account water delivery and removal in relation to time of sowing. Unhappily, this delivery time is sometimes when streams are in flood. They found that this delivery rate at sowing time could be calculated when the sum of the daily average temperatures is 130° centigrade. This excess of heat over zero centigrade begins as soon as the snow is melted, or from 0°C if there is not much snow. Separate equations for these factors are developed for each river.

They have investigated the norms of swamp drainage on already drained areas and for those about to be drained. These results show clearly that the yield of water increases with depth to the water table and then sharply falls at greater depths. They found the optimum norms for the water table to be about 60 to 70 centimeters for grass and about 80 to 100 centimeters for potatoes. (These seem

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somewhat great to me and must be related to rather wide spacing.) They insist that deep drainage is satisfactory in wet peat about 80 to 100 centimeters deep over sand. In such situations they have taken the water table down to as low as 5 meters. (Offhand, this seems much too deep to me.)

I raise a question about the danger of soil blowing but they claim that they rarely have droughts and that these soils hold water well. Occasionally they have provided for adding water in drought periods to the drainage canals but this has not proved useful in many places.

They show us some large charts giving their equations for calculating distances between drains. (K-2517, -18, -19) These are said to be included in recent textbooks.

They study the physical and mechanical properties of soils and changes occurring in the river beds. Here they study the movement of water by the use of radioactive elements. We are shown a portable survey meter for field use. This makes use of sulphur, rubidium, or chlorine isotopes. We are also shown the laboratory counters used for samples taken from the fields. (Although our time is short they seem to be willing to show us everything, including things that might have been supposed to be classified.)

Now we go downstairs to look at the hydraulic laboratory where they are studying the permissible speed of water in the canals. They say that they have proved that the non-erosive velocities can be

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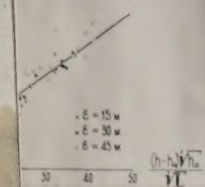
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ОРМЭЛА ВОДЫ К ДРЕНАМ

$$\frac{i(h-h_0)\sqrt{h_0}}{\sqrt{L}}$$



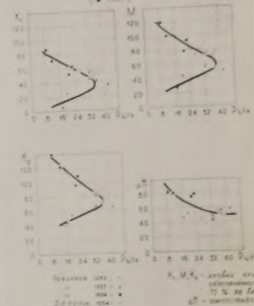
РАСЧЕТ РАСТОЯНИЙ МЕЖДУ ДРЕНАМИ

$$E = \sqrt[4]{\frac{1}{h_0} \left[\frac{25\psi K T \omega (2t-H-u-2h_0)^3}{\delta \pi (H-u) + 4(N-V)} \right]}$$

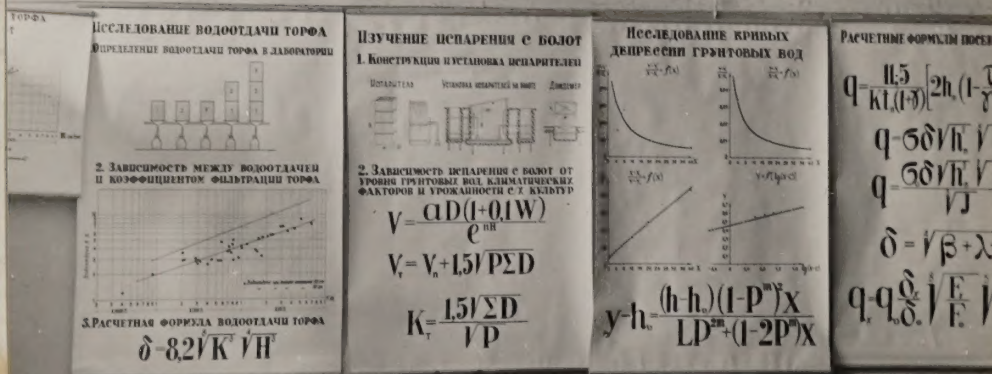
$$E = 4 \sqrt{\frac{2KTh_0}{\pi \delta \ln \frac{(t-u-h_0)(t-H+h_0)}{(t-u+h_0)(t-H-h_0)}}}$$

ЗАВИСИМОСТЬ УГ ОТ УРОВНЕЙ Г

ПОСЛОВИЕ ТРАВЫ



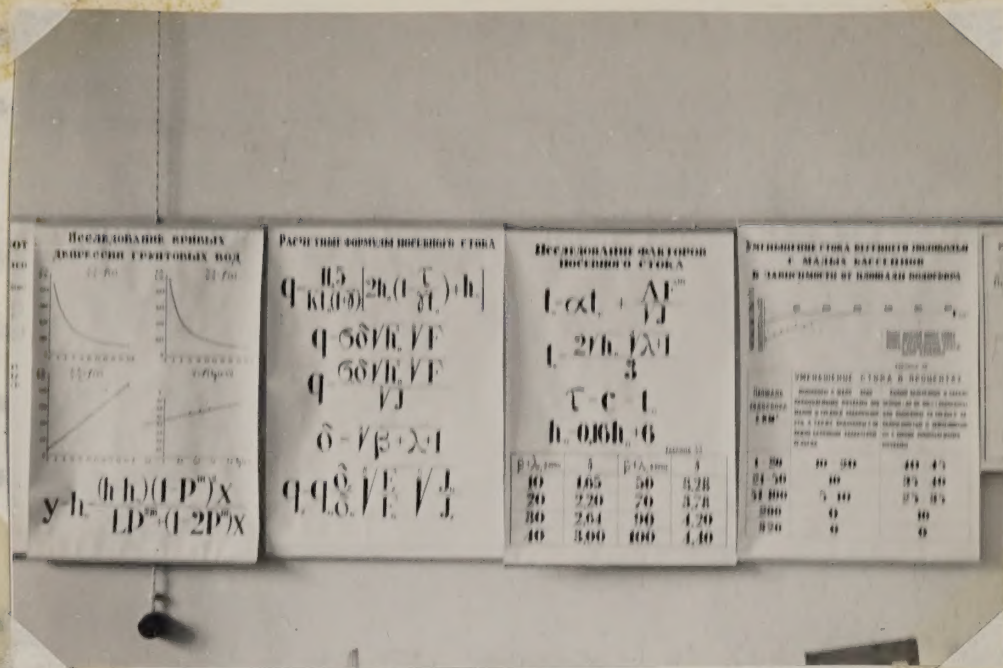
K-2517. July 24, 1958. Minsk. Formulae for calculating distance between drains at Amelioration Institute.



K-2518. July 24, 1958. Minsk. Formulae for calculating distance between drains at Amelioration Institute. (Another view.)

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K-2519. July 24, 1958. Minsk. Formulae for calculating distance between drains to water. They claim at Amelioration Institute.



K-2520. July 24, 1958. Minsk. Amelioration Institute: hydro-technical laboratory.

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In an adjacent laboratory they are studying the friction of peat soils, compression of peat, and changes in its permeability to water. They claim that all these characteristics must be known for proper designs of canal beds, slopes of the canals, and the stability of roads and other structures.

Certainly these men here know how to get money for soil research. This year they have a 30 percent increase in their budget, all of which comes from the government of Belorussia.

At 1:30 p.m. we return to the hotel for a very slow lunch, and then leave for the experimental station near Minsk of this Institute on amelioration at 3:00 p.m. We arrive at 3:15.

First we are taken to see the lysimeters filled with peat where they are studying the effects of different depths of the water table and other active practices on potatoes, corn, and other crops. (K-2522) Their studies indicate that a depth of 80 to 100 centimeters is nearly ideal for their crops. For grasses, wheat, and fiber flax they maintain the water table at 70 to 90 centimeters. At this

62

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-July 24, 1958. At the Amelioration Institute in Minsk.
L to R: S. G. Skoroparov, Director;
Melnikov; Donnan; Lupinovich; Kellogg;
Eddie. (Photo by Bulik).

July 24, 1958. At the Amelioration Institute in Minsk.
To R: S. G. Skorogonov, Director;
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installation they also check the temperature every day, the water extracted by plants for all vegetable production, and finally the effect of the water table on yield and quality of crops.

The work in the lysimeters looks good to me, but that on water balance in pots does not seem well controlled. We are taken in to see moisture studies where plants in pots are on little cars that can be shifted from the greenhouse to out-of-doors and back again. They claim that they check the water here daily but I don't see how the measurements can be very exact.

They have a lot of pots in a wire cage where they are studying the fertilizer needs for crops. We are told that azotobacter helps on peat soils and may increase yields as much as 100 percent assuming proper fertilization with copper, potash, and phosphorus. But I can not see this difference from azotobacter alone; but I can see a big effect of nitrogen fertilizers. Then we are told the effects of azotobacter show up only on the grain during the ripening period. (But I certainly don't believe they get anything like 100 percent) Their experiments demonstrate the need for phosphorus and potassium on the newly drained peat soils. They tell us that oats respond to nitrogen only in pots, not in the field. This seems curious.

On the basis of their experiments they recommend 60 kg of P_2O_5 per hectare for cereals. I notice that some of the corn and oats in these experimental pots is quite diseased. They show dramatic effects of fertilizer on oats and hemp. They are trying to push fiber flax. But it is not yet grown on a large scale. Copper has

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K-2522. July 24, 1958. Minsk. Experimental Station of Amelioration Institute. View of lysimeters with potatoes in peat soil.



July 24, 1958 K-2521. July 24, 1958. Minsk. Experimental Station of Amelioration Institute. (Phot) General view of pot work.

K-2522. July 24, 1958. Minsk. Experimental
Station of Amelioration Institute.
View of lysimeters with potatoes in pest

K-2521. July 24, 1958. Minsk. Experimental
Station of Amelioration Institute.
General view of pot work.



July 24, 1958. At the experimental station near Minsk.
(Photo by Bulik).

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July 24, 1958. At the experimental station near Minsk.
(photo by Bulik).



July 24, 1958. Pot experiments with fertilizers at the experimental station near Minsk. (Photo by Bulik).

July 24, 1958. Pot experiments with fertilizers at the experimental
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a big effect on flax and they recommend 2 kilograms of pure copper per hectare, or 1/2 ton of an impure copper byproduct mixed with the phosphorus and potassium. The corn shows a good residual effect of recent copper treatments. We are told that no other trace element gives any great response.

I see that the soils here are very good peat soils and comparable to our Carlisle muck of the Lake States.

We are taken for a light lunch in the garden. I am amazed at the nice cherries grown here on these peat soils.

It is a bit difficult to understand clearly the crop rotation system partly because land devoted to perennial grass is not called "cropland" even though perennial grasses are a regular part of the cycle. They say that they use mainly a 9-year rotation as follows:

1. Perennial grasses
2. Cabbage and potatoes
3. Winter rye
4. Perennial grasses
5. Perennial grasses
6. Perennial grasses
7. Sugarbeets or other row crops
8. Spring cereals
9. Hemp or sugarbeets.

As I understand this rotation they would have say 4 fields, one of which would be under perennial grasses. Often after the grasses they have winter rye followed by rye and a row crop, then cereals, then hemp, and finally another row crop.

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July 24, 1958. At lunch at the experimental station near Minsk.
(Photo by Bulik).

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July 24, 1988. At lunch at the experimental station near Minsk.
(Photo by Bulik).



K-2523. July 24, 1958. Minsk. Experimental Station of Amelioration Institute. One of the main drains in peat soil, much like our Carlisle.



K-2524. July 24, 1958. Minsk. Experimental Station of Amelioration Institute. First year of meadow after drainage of peat soil (Bulik).

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Station of Amelioration Institute.
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K-2524. July 24, 1958. Minsk. Experimental
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First year of meadow after drainage
of peat soil (Bulik).

We walk over a cabbage field where drainage was begun in 1911. (K-2523) They tell us that here they started with rather wide ditch spacing and found that 100 meters was a proper spacing. This seems a bit wide to me. Then in 1925 they started with



K-2525. July 24, 1958. Minsk. Diagram of experimental farm of Amelioration Institute.

from about 1 meter thickness of peat, to 60 centimeters. They say that each year organic matter is decomposed and mineralized. Soil crop residues replace 2.5 to 3 tons per hectare giving an annual loss of about 3 tons.

They emphasize that this peat is not used for fuel, only the high moor peat; but this good peat is often used in compost.

We are shown some plots for studying afforestation on the drained soil so that collectives may take some timber trees.

K-2525. July 24, 1958, Minsk. Diagram of experimental
farm of Amelioration Institute.

We walk over a cabbage field where drainage was begun in 1911. (K-2523) They tell me that here they started with rather wide ditch spacing and found that 100 meters was a proper spacing. This seems a bit wide to me. Then in 1925 they started with closed drains: clay tile, wooden tile, and French tile. By 1941 they had found that the open drains had the same effect on yields as the closed drains. Thus only the main drains are open on this place now.

They have fields of 10 hectares that are not crossed by any canal or closed drain. They gave me the following yields:

Cereals, 3 to 4 tons per hectare

Potatoes, 30 to 50 tons per hectare

Grass (as dried hay), 10 to 15 tons per hectare

Green corn fodder, 50 to 60 tons per hectare

Carrots, up to 100 tons per hectare

Hemp, 1 to 1½ tons of fiber per hectare.

In 40 years the subsidence has been about 1 percent per year, from about 1 meter thickness of peat, to 60 centimeters. They estimate that each year about 6 tons per hectare of the organic matter is decomposed and mineralized. But crop residues replace 2.5 to 3 tons per hectare giving an annual loss of about 3 tons.

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Cereals, 3 to 4 tons per hectare
Potatoes, 30 to 50 tons per hectare
Grass (as dried hay), 10 to 15 tons per hectare
Green corn fodder, 50 to 60 tons per hectare
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They use a mechanical excavator to clean the drains and keep the slopes planted with perennial grasses.

For a meadow crop here they use clover, timothy, and annual French ryegrass. The following year there is no ryegrass. The yields appear to be good and I see few weeds (K-2524).

They have a series of plots for studying cereals that can be grown without lodging. This requires a combination of soil science and plant breeding. Here on the peat soil they must select lodging-proof varieties as well as ones resistant to brown rust, yellow rust, and mildew. Also the growing season is short and they try to have crops with short straw.

Because of the high nitrogen from the decomposition of the organic matter, with high moisture they get lodging and disease. Additional potassium helps a little, but not very much.

They start sowing cereals in the spring when the peat soil has melted to about 12 or 15 centimeters. All the cultivation is done in autumn.

I look at a profile of this peat soil. The color of the turfy surface soil is black about (5YR 2/1). The whole soil is said to be about 180 centimeters deep. I notice a black silty layer at 60 centimeters which is said to be 12,500 years old as determined by pollen analyses.

We see some nice sugarbeets that they claim will yield 4.5 to 5 tons of sugar per hectare. They tell us that they are now using ^{mono-germ} A sugarbeet seed. I look at the soil here and find that it is 94 centimeters to coarse, compact sand and fine gravel. The sandy layer that

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meters to coarse, compact sand and fine gravel. The sandy layer that

was at 60 centimeters in the virgin profile is at 30 centimeters here after long cultivation. This suggests a loss of perhaps 30 centimeters of peat in the 38 years since the field was drained.

We have some discussion about overdrainage. It seems to me that the drains are too far apart and that near the drains there is some excess drainage. They maintain that when rainfall is normal yields of sugarbeets, potatoes, and cereals are best in the "overdrained" areas. During drought years yields of the same crops are similar in both normally drained and overdrained areas. Yet the yields of perennial grasses are reduced by 10 to 15 percent with overdrainage. It is claimed that the quality of crops is higher in the overdrained fields with more starch in the potatoes and more sugar in the sugarbeets. I ask about soil blowing but they insist that this hazard is avoided by having perennial grasses in the rotation. I am told further that after some drainage and cultivation the drains can be deepened.

I see one section of this overdrained soil like Carlisle muck that would blow badly in many parts of the United States. Here there are 90 centimeters of the organic soil over coarse compact sand. Water moves up from this layer partly by capillary action but I suppose mainly by vapor movements. Of course the soil decomposes rather fast under these conditions, but the water-holding capacity is quite good and plants are said to endure drought well. I note that the roots of perennial grasses go down almost to the sand layer. In a nearby well it is 359 centimeters to the water table.

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We are taken to see a large field having a collection of 234 varieties of corn. This year has been too cool for good results. Most varieties are less than a meter high and some hardly more than 25 centimeters.

We go to another lunch with toasts and writing in the guest book.

On the way back to the hotel we stop to look at the hemp. We return at 8:30 p.m. and have another very slow dinner. I am now ready for bed at 11:00.

This is a remarkable city with nice buildings, shops, parks, and the like, when one recalls that most of it was destroyed during World War II.

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July 25

When we get up the sky is overcast and suggests rain. Opposite our hotel is a special place where pigeons are fed and where water for them is provided.

We leave Minsk for visits in the country at 9:15 a.m. I see a few women working with men at hard labor repairing the streets; but fewer than I saw in 1945.

We go east from the city on a gently undulating to rolling ground moraine. The material is rather sandy on the hills. Some of the hills have been eroded. The cover is mostly pine.

In the suburbs I see a few of the old style wooden houses. This is a moderately good black-top road with plantings of trees and shrubs along the side. The trees are mostly white birch and aspen. The hilly land suggests Coloma and sandy Bellefontaine. The C slopes are in scrubby woodland. Grain crops on the upper B slopes are thin. We come into a large area of nearly flat land with Bog soils, some recently drained. In general, the landscape suggests north-central Wisconsin.

At 10:00 we come to a reclamation area said to be part of the Volma reclamation scheme. The plan is to develop 25,000 hectares of peat soil. They started two years ago and have 7,000 hectares finished. The station has bulldozers, ditch diggers, and other machines. Each station is said to have 20 different types of machines. Each of these reclamation stations does about 7 to 11 million rubles worth of work

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K-2526. July 25, 1958. Near Minsk. Volma reclamation area; making 3d order ditches.



K-2527. July 25, 1958. Near Minsk. In Volma reclamation area. Tile-laying machine with caterpillar tractor. (The tile are laid by hand on boards and the joints covered with moss).

K-2526. July 25, 1958. Near Minsk. Volma
reclamation area; making 3d order
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K-2527. July 25, 1958. Near Minsk. In Volma
reclamation area. Tilt-laying machine
with caterpillar tractor. (The tile
are laid by hand on boards and the
joints covered with moss).

annually. Here the main drains are already in and they are now making mostly third-order drains for which they use chain-type bucket excavators of one-fourth cubic meters and other machines. As soon as the area is partly drained they add closed drains of clay tile.

The peat here is roughly two meters deep over stratified sand which appears to be partly outwash and partly lacustrine in origin. The sand is mostly coarse but there are silt and fine sand strata. Further along the ditch I see silty gley under the peat. The pH of the surface soil runs between 5 and 7.

There are a lot of machines here and I suspect they are put to work especially for demonstration to us. Obviously some are being tested.

I see one back-hoe excavator making third-order ditches to 130 cm. (K-2526) After the water is out clay tile will be lain. This work costs 3,000 rubles per hectare.

I look at another much larger machine for digging trenches for laying tile. (K-2527; K-2641) Here the peat is somewhat less well decomposed than that seen yesterday. A rather poor quality of clay tile is being laid on boards at the bottom of the ditch about 140 cm. deep. I am told that the average depth for the line is 175 cm. People are laying this tile with water still in the ditch and sealing the joints with sphagnum moss. Many of the workers are women.

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(Added later: I suspect that this machine is a copy of a Dutch machine.) So far as I can see the machine operates fine although I wonder whether this tile line is really a part of the program.

Here they clear off the vegetation, plow, sow a crop, and smooth the surface.

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(K-2642) (C
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Spacing var
resistance



K-2641. July 25, 1958. Near Minsk. Volma drainage area. Tile-laying machine.

tractor. The ditch is 30 to 100 cm. deep. (K-2643)

These machines look all right to me but I doubt that they would work in anything but peaty soils. Then they demonstrated a large machine to make wide drains. (K-2645) I am told they have a hydraulic system for controlling the depth of the ditch. It is not entirely clear to me how this works but it has some kind of speed governor and Swedish level. But even when they have everything is necessary on rough ground. The soil is 33 cm. in thickness and is

annually. These two main basins are situated in the north and south
ending north-south basins for water supply and drainage.
Further experiments of one-fourth cubic meters and other machines
in such as the area is partly drained they are almost devoid of

also this.

The next part is to build the water supply and drainage system.

K-2641

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(K-2641)

2641

K-2641. July 25, 1958. Near Minsk. Volma
drainage area. Tilt-laying machine.

laying tile. (K-2641; K-2642) The next is to build the water

discharge area. The next is to build the water

tile is being laid on the bottom of the ditch. The

deep. I am told that the average depth of the ditch is 1.5

are laying this tile with water. The tile is being laid

jointly with the water. The tile is being laid

(Added later: I suspect that this machine is a near copy of a Dutch machine.) So far as I can see the machine operates fine although I wonder whether this tile line is really a part of their program.

Here they clear off the vegetation, plow, sow a crop, and then smooth the surface.

I talk briefly with Mr. V. I. Zhukov, the chief engineer. He shows me some of the tile but they are not well burned.

I then go over to a huge V-shaped ditcher which is mounted on one tractor and given help by another caterpillar with a big winch. (K-2642) (In fact I have to ride on this for the Soviets to get official photos.) These ditches are 130-150 cm. deep and are called third-order open ditches. The side slopes are about 1:.75 to 1:1. I am told this machine can make 6 to 7 km. in one 8 hour shift. Spacing varies from 100 to 300 meters. I am told that the pulling resistance is 10 to 14 tons.

They demonstrate a similar machine of smaller size pulled by one tractor. The ditch is 80 to 100 cm. deep. (K-2643)

These machines look all right to me but I doubt that they would work in anything but peaty soils. Then they demonstrate a large machine to make mole drains. (K-2528) I am told they have a hydraulic system for controlling the grade level automatically. It is not entirely clear to me how this works but it has some kind of speed governor and Swedish level. But they admit that hand regulation is necessary on rough ground. The mole is 25 cm. in diameter and is

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K-2642. July 25, 1958. Near Minsk. Volma drainage area. Big ditching machine, self propelled, for depths of 130 to 150 cm.



K-2643. July 25, 1958. Near Minsk. Volma drainage area. Ditching machines for ditches 80 to 100 cm. deep pulled with one tractor.

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K-2642. July 25, 1958. Near Minsk. Volma drainage
area. Big ditching machine, self propelled,
for depths of 130 to 150 cm.

K-2643

K-2643. July 25, 1958. Near Minsk. Volma drainage
area. Ditching machines for ditches 80 to
100 cm. deep pulled with one tractor.

pulled at a depth between 60 and 140 cm. They are spaced some 10 to 30 meters apart. I was told that this is the cheapest method of drainage. It lasts about 5 to 8 years and must be repeated.



to me 1K-2528. July 25, 1958. Near Minsk. In Volma reclamation area. Machine for making mole drains. Hydraulic system used to control grade level.

Then we saw with prongs something like those I have seen in Alaska but with shorter prongs and not so good for shaking the soil off the roots. They also demonstrate a machine for cutting the brush. The one I saw was a headed piece of steel like a scowder with heavy side wings to overturn and uproot bushes, small trees, and saplings. The depth level is controlled by a hydraulic device and large springs. We saw

K-2528. July 25, 1958. Near Minsk. In Volma reclamation
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pulled at a depth between 60 and 140 cm. They are spaced some 10 to 30 meters apart. I am told that this is the cheapest method of drainage. It lasts about 3 to 5 years and must be repeated. The driver makes 8 to 10 km. in an 8 hour shift. (In Sod-Podzol they use moles of 10 to 15 cm. in diameter.)

The people here have certainly gone to a lot of trouble to show us these machines. I next go to an interesting one for cleaning the bottom of large ditches or for deepening them. (K-2644). This is pulled by a very large caterpillar tractor with a power take-off which operates a rapidly whirling bladed disk that throws the mud up on the side and over the edge of the ditch. On this large ditch I am told that the vertical grade is 0.00006 to 0.0001. The ditch slopes are about 1:1.75. It seems to me that I have seen a machine like this but I can't remember where. (Added later: I heard later that a machine like this had been in use in England for some time. I might have seen one in the fens near Cambridge.) On the whole this looks to me like a pretty good rig although very big.

Then we walk over to see some land clearing. They use a bulldozer with prongs something like those I have seen in Alaska but with shorter prongs and not so good for shaking the soil off the roots. Then they demonstrate a machine for cutting the brush. The cat pushes forward a hooded piece of steel like a snowplow with heavy side knives to overturn and uproot bushes, small trees, and coppices. The appropriate level is controlled by a hydraulic device and huge springs. We are

72

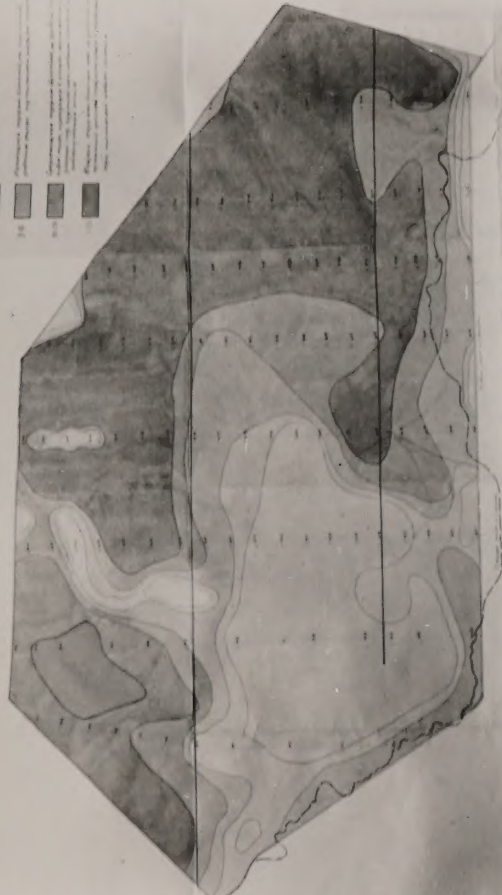
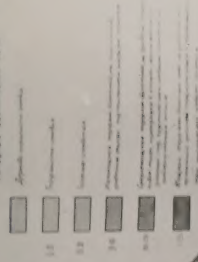
pulled at a depth between 60 and 140 cm. They are spaced some 10 to 30 meters apart. I am told that this is the cheapest method of drainage. It lasts about 3 to 5 years and must be repeated. The driver makes 8 to 10 km. in an 8 hour shift. (In Sod-Podzol they use moles of 10 to 15 cm. in diameter.)

The people here have certainly gone to a lot of trouble to show us these machines. I next go to an interesting one for cleaning the bottom of large ditches or for deepening them. (K-2644). This is pulled by a very large caterpillar tractor with a power take-off which operates a rapidly whirling bladed disk that throws the mud up on the side and over the edge of the ditch. On this large ditch I am told that the vertical grade is 0.0006 to 0.0011. The ditch slopes are about 1:1.75. It seems to me that I have seen a machine like this but I can't remember where. (Added later: I heard later that a machine like this had been in use in England for some time. I might have seen one in the fens near Cambridge.) On the whole this looks to me like a pretty good rig although very big.

Then we walk over to see some land clearing. They use a bulldozer with prongs something like those I have seen in Alaska but with shorter prongs and not so good for shaking the soil off the roots. Then they demonstrate a machine for cutting the brush. The cat pushes forward a hooded piece of steel like a snowplow with heavy side knives to overturn and uproot bushes, small trees, and coppices. The appropriate level is controlled by a hydraulic device and huge springs. We are

КАРТА ПОЧВ ОПЫТНО-ПРОИЗВОДСТВЕННОГО УЧАСТКА В ПОЙМЕ РЕКИ СЛОУСТИ

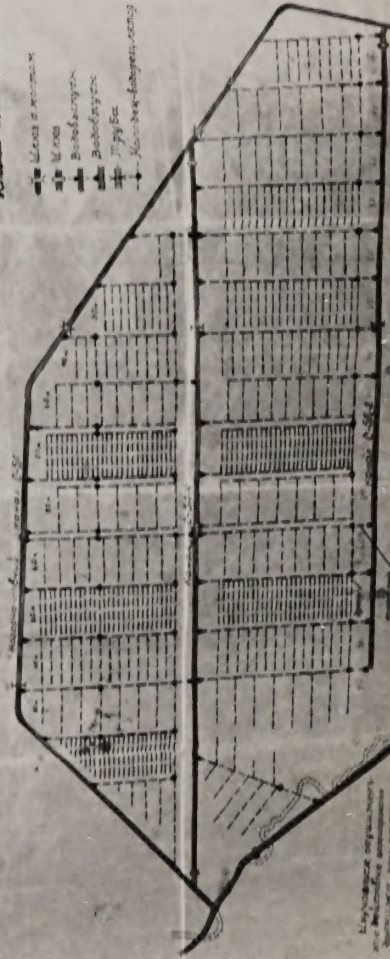
Значения показателей почв



ОСУШИТЕЛЬНАЯ СЕТЬ ЗЫБЫНО-ПРОИЗВОДСТВЕННОГО УЧАСТКА В ПОЙМЕ Р. СЛОУСТЬ ЩИНСКОГО РАЙОНА

Краткое описание:

- Шоссе в поселке
- Шоссе
- Водопровод
- Водосток
- Труба
- Канализационная



K-5252. 777A 52, 7028. WSEL WITUK. ON COLLECTIVE TERM, COMING IN. 2011 WED AUG 21ST 1958 BYEN.

shown another type that can cut trees up to 20 cm. in diameter. The cut bushes are allowed to stand for 10 to 15 days to dry. But they do not burn them. They rake them into piles and let rot for two years, then the tractors run over them and spread the piles over the field.

As removed this good enormous mounted about 50 all. I place to part of a in the ca



K-2644. July 25, 1958. Near Minsk. Volma drainage area. Machine for cleaning and deepening large ditches.

area of Red House. collective farm going by with a herd of mixed dairy cows in only fair condition. As we drive on past this farm the buildings are rather poor and unpainted. Both rye and potatoes are rather poor.

We drive on to the Cosiatera Collective Farm. These country earth roads are very dusty when dry and very muddy when wet. As we drive along I see potatoes, flax, rye, some poor corn, and some green clover.

K-5644. July 25, 1958. Near Minsk. Volms
drainage area. Machine for cleaning
and deepening large ditches.

2644

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The cut bushes are allowed to stand for 10 to 15 days to dry.

But they do not burn them. They rake them into piles and let them rot for two years, then the tractors run over them and smooth the piles down.

As we walk to another area we pass a place where peat is being removed and dried for fuel, despite their statement yesterday that this good peat wasn't used for fuel. Then they demonstrate an enormous moldboard plow mounted on a tractor. A big roller is mounted in front to smash down any small brush. The furrow is about 50 cm. deep and 1 meter wide. It turns under low bushes and all. After plowing, the soil is disked and seeded.

I ask what is the first crop but am told that this is not the place to answer! I am told that this area we are visiting will be part of a collective farm to be called the Hero of Labor. We get in the cars and drive on and stop for a light lunch on an undulating area of Sod Podzol with a few glacial boulders. I see women of the collective farm going by with scythes. I see a herd of mixed dairy cows in only fair condition. As we drive on past this farm the buildings are rather poor and unpainted. Both rye and potatoes are rather poor.

We drive on to the Comintern Collective Farm. These country earth roads are very dusty when dry and very muddy when wet. As we drive along I see potatoes, flax, rye, some poor corn, and some good clover.

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July 25, 1958. Near Minsk. A machine for removing small trees.
(Photo by Bulik).

July 25, 1958. Near Minsk. A machine for removing small trees.
(Photo by Bulik).



July 25, 1958. Near Minsk. Heavy roller pushed by tractor, which also pulls a huge plow for the first plowing of peat soil. (Photo by Bulik).

July 25, 1958. Near Minsk. Heavy roller pushed by tractor, which also pulls a huge plow for the first plowing of peat soil. (Photo by Bulik).

We drive onto an area of Bog soil reclaimed two years ago. We meet the chairman of this farm, L. V. Chekalin. He tells me that the average collective farm has 3,500 hectares, 311 families, and 580 workers.

The agronomist on this farm graduated in 1951 from the Belorussian Agricultural Academy with engineering training. Here they have 1,500 hectares of mineral soils under crop and 700 hectares of peat soils. They expect to reclaim 250 hectares more of the peat. Three hundred hectares of the reclaimed soil have clay-tile drains. We are shown a map of this drained area made by examining each 10 square meters.

The Institute has some experiments here with clay tile at spacings of 20, 30, 40, 50, and 60 meters in a regular pattern. (K-2529)

Their first crops were corn, potatoes, oats, and perennial grasses. According to the feeding stuff produced, potatoes made the best first crop. According to labor costs, perennial grasses made the best first crop and corn the second best.

I note that the material under the peat here is a silty very fine sand.

The corn is spotty and not good because of excess rain and low temperatures. They fertilize it with 120 kilos of K_2O and 70 kilos of P_2O_5 per hectare. This is broadcast with a seed drill and followed by a disk harrow. They also use 500 kilos per hectare of a copper-containing by-product which has 2.5 kilos of pure copper in it. This is said to be good for 5 or 6 years. They say that the soil contains 3.5 percent nitrogen on a dry basis. They have had no results from treating seeds with azotobacter.

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In the low places the perennial grass winter-killed. After a few crops the land will be smoothed.

We are also shown plots with various fertilizers for corn, barley, and millet.

The Institute is checking the water levels here. They use a 10 cm. in diameter for observation. To the bottom there is a disk for giving it stability. The lower one meter has no disk. The lower part

Since the disk is 28 cm. deep

This is the water table at or below

We then 90 kilos of P

Now they



K-2530. July 25, 1958. Near Minsk. Chairman L. V. Chekalin of Comintern Collective Farm in corn field.

They get more feeding stuff than from cereals and the soil is more rapidly recovered.

Then we are taken to this collective farm headquarters for a heavy lunch - such food, vodka, etc., and many toasts and songs. Melnikov irritates us a bit with a toast that suggests that the Russian people have two attitudes, one toward the Government and one toward the soil.

K-2530. July 25, 1958. Near Minsk. Chairman
L. V. Cherkashin of Communist Collective
Farm in corn field.

In the low places the perennial grass winter-killed. After a few crops the land will be smoothed.

We are also shown plots with various fertilizers for corn, barley, and millet.

The Institute is checking the water levels here. They use pipes 10 cm. in diameter for observation. To the bottom there is fastened a disk for giving it stability. The lower one meter has many holes. The lower part of this section is covered with a fine brass screen. Since the disk at the bottom is 28 cm. in diameter, they bore a hole 28 cm. deep and fill around it with gravel.

This is quite elaborate and expensive but should work. They check the water table every day. They can cultivate when the water table is at or below 40 cm.

We then see sugarbeets. These are given 150 kilos of K_2O and 90 kilos of P_2O_5 per hectare.

Now they talk about the first crop. They say that contrary to the general idea of vetch and oats or oats as the first crop, they recommend starting with a row crop such as potatoes, roots, or corn. They get more feeding stuff than from cereals and the surface soil is more rapidly decomposed.

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Russian people have two attitudes, one toward the Government of the

United States, which they don't like, and another toward the people of the United States, whom they do like. The chairman seems quite dictatorial toward his staff but he explains to me that he is not appointed by the Communist party, which makes me sure that he is. In his toast he supports "Peace and atomic isotopes only for agriculture."

We leave the farm at 5:00 p.m. with little opportunity to talk to any of the people. This sort of banquet is a bit tiresome. And most have had too much to drink.

As we drive on I see a great deal of potentially good land still to be reclaimed.

We stop at the Western Machine-Testing Station of the Ministry of Agriculture of the USSR. I am met by the director, Mr. Yakerson. Here tractors and other machines are tested for use in this Republic, both ordinary farm machines and those for reclamation and transport. I am shown several tractors. One has extremely large wheels with pneumatic tires to keep the soil pressure down to .2 kilo per square cm. I am shown one with a four-wheeled drive for which they claim 30 to 40 percent increase in pulling power. They also have a track-laying tractor from Stalingrad with very wide tracks for peat soil. I am shown moles made of wood, which are said to be cheaper and to have lower resistance than metal ones.

One combination machine has a fertilizer distributor, followed by a heavy roller, a cereal seeder, a grass seeder, and finally a small roller.

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K-2531. July 25, 1958. Near Minsk. Western Machine-testing Station. A machine for disking, scraping, and chains to cut turf (grass "nigger heads") of peat soil.



K-2532. July 25, 1958. Near Minsk. Western Machine-testing Station. The big plows for peat soils. (Nina M. Ryabova, teacher in the Academy of Agricultural Sciences at Minsk.)

K-2531. July 25, 1958. Near Minsk. Western
Machine-testing Station. A machine
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cut turf (grass "nigger heads") of
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K-2532. July 25, 1958. Near Minsk. Western
Machine-testing Station. The big plows
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I photograph a machine for disking and scraping, along with chains to cut the turf of marshland (K-2531). I also photograph one of the big plows used in marshland (K-2532).

Eddie is indisposed because of the heavy lunch and translation is a little difficult with Mrs. Ryabova.

I look at combines and threshers for flax and hemp. They have machines to pull flax, to thresh it, and to crush it between rollers. One large corn planter has six seed boxes. The potato planters and many other machines seem very heavy.

At 6:50 p.m. we start for the hotel. Some of the boys are a bit ill and sleepy. I overhear that our translator was fired for drinking too much.

In the evening I talk to Melnikov and Eddie and get things patched up so that he can continue on with us.

I feel that the time at the collective farm and the toasts were obviously staged. We wasted a lot of time that I should have liked to have used to go over the rest of the farm on the Sod Podzol. The crops of rye and potatoes look small and nitrogen deficient. Yields will be low. Perhaps the chairman is over emphasizing the peat soils to the neglect of the other fields.

And so to bed.

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July 26

I slept well until about 5:15. The sun shines, the doves coo, and it promises to be a nice day. So I am up.

A little before 7:00 I go for a walk on the main street. Like Moscow, the streets are swept in the early morning and are very, very clean. There are many sweepers on the street, mostly women, who work with buckets and long brooms.

We have breakfast, pack, and settle our bills. We are in the cars at 9:15 to visit the collective farm, New Life, some 25 kilometers south of Minsk.

Despite all the rain I see a big tank truck going down the street watering the trees from a horizontal pipe. I should not think this necessary, but I suppose it is in somebody's plan. We pass over an undulating to gently rolling, fairly well dissected plateau, with loess over what looks like some marine materials. I don't know whether they have been glaciated or not, but I suspect so. The soil is said to be Sod Podzol under forest. Lime is needed for good crops. The pH of the natural soil is said to be 5.5. The road cuts suggest a moderate B horizon of slightly reddish-brown soil.

We cross the Ptich River. I see a few ponds but this soil area generally has well developed drainage. The road is fairly good black top with trees and shrubs along the margins.

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I see a rather poor cabbage crop and only fair potatoes and rye. There are a few fruit trees. I see some poor lupines. We pass a field of barley that looks quite good and might run 25 bushels per acre. Pastures are good with both cattle and sheep. Yet certainly yields could be much better.

We turn onto an earth country road that is now dry. It is obviously very bad indeed when wet. We arrive at the farm and I see some new machine shops made of brick. The houses are rather poor and made of logs and wood and the streets are unpaved (K-2533).

This farm has 1,600 cultivated hectares out of a total area of 3,000 hectares. They have 100 hectares of apples and pears.^{1/} Because of the emphasis on milk we are immediately given figures as follows:

<u>Year</u>	<u>Centners of milk per 100 hectares</u>	<u>Kilograms of milk per cow</u>
1953	90.3	1,112
1956	216.4	2,017
1957	275.4	2,527
1958	330.0	2,900

This is the total milk, including that used by calves.

(Added later: Apparently the calves are weaned almost immediately and on other farms I learned that only about 70 percent of the total milk is sold. This 30 percent difference must be waste and milk fed to calves or pigs.)

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Our time is very short so we don't get more facts. We
are handed a little publication about the farm. Yet as I leave
I am able to photograph the plan hanging in the entrance way,
which reads as follows (in translation):

SOCIALIST OBLIGATION

We, collective farmers of the kolkhoz "New Life", in
response to the recommendation of the Jubilee Session of
the Supreme Union--to
competition
attainments
following



K-2533. July 26, 1958. Near Minsk. Part of
street on New Life Collective Farm.

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We, collective farmers of the kolkhoz "New Life", in response to the recommendation of the Jubilee Session of the Supreme Soviet of the USSR "To the Peoples of the Soviet Union"--to raise higher the banner of the popular Socialist competition for new achievements in economic and cultural attainments, we obligate ourselves in 1958 to reach the following indices:

In Field Production:

To Harvest From Every Hectare:

Grain crops - 22 centners
 Potatoes - 160 centners
 Vegetables - 200 centners
 Corn for silage - 350 centners
 Fodder root crops - 280 centners
 Perennial grasses for hay - 25 centners

To Procure and Spread to the Fields:

Manure - 4,500 tons
 Peat - 11,500 tons

To spread lime on acid soils - 100 hectares

In Livestock Production:

Milk from each grazing cow - 2,900 kg. milk
 Obtain for every 100 hectares of agricultural lands:
 Milk - 330 centners
 Meat - 100 centners
 Of which pork - 64 centners
 Receive from each laying hen - 90 eggs
 Shear wool from each sheep - 3.3 kg.

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Of which pork - 64 centners
Receive from each laying hen - 90 eggs
Shear wool from each sheep - 3.3 kg.

Procure for Collective Livestock:

Coarse feeds - 3,975 tons
 Succulent feeds - 5,200 tons
 Of which silage - 4,000 tons
 Fodder root crops - 1,200 tons
 Concentrates - 485 tons

Pay out For Each Labor Day: Money 8 rubles, Grain
 2.3 kg., potatoes 4 kg., coarse feeds 1.5 kg.

On a pole near the headquarters a blaring loud speaker apparently gives the official radio broadcast of news and music all the time.

Some of the soil slopes on this farm are fairly strong. These sloping soils are partly in pasture and partly in woodland. The people I see on the farm look to me a bit tired and just a bit shabby but the children seem well (K-2645). I see vetch and oats being used as a soiling crop. I should estimate the rye at about 25 bushels per acre. The corn is short and nitrogen deficient. It is said that it followed rye used for soiling and that, it in turn, will be used for soiling.

I walk into a new building for storage, washing, chopping, and cooking potatoes that are fed to the dairy cattle. The dairy barn has concrete stalls. The cows are milked by hand, but equipment has been purchased for machine milking.

I see workers weeding rather poor-looking sugarbeets that are said to have followed rye cut green for soiling. At the back of the barn I see green-cut oats and vetch being unloaded from small horse-drawn carts (K-2535). There is a large manure pit. The manure is not well stored, and it is also hauled to the fields in

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Coarse feeds - 3,975 tons

Procure for Collective livestock:



K-2645. July 26, 1958. Near Minsk. New Life Collective Farm. Mother and children.

Present for Collective Farm

Grain (wheat) - 3,500 tons
Potatoes - 2,500 tons
Of which wheat - 1,500 tons
Total grain - 1,500 tons
Concentrates - 500 tons

For the last three years, the grain
has been 2.3 kg. potatoes & 1.5 kg. grain

10-2645

K-2645. July 26, 1958. Near Minsk. New Life
Collective Farm. Mother and children.

born has concrete floor. The room is light and airy.
There has been potatoes for many years.
I see doctors working faster than ever before.
We have to have children who are strong and healthy.
The farm I see grows for sale and for the people.
Horse-drawn carts (K-1515). There is a large number of
carts is not only used, but is also used for the people.



K-2535. July 26, 1958. Near Minsk. On New Life Collective Farm. Unloading green oats and vetch at dairy barn.



K-2536. July 26, 1958. Near Minsk. On New Life Collective Farm. Distant view of new orchard.

K-2536. July 26, 1958. Near Minsk. On New Life Collective Farm.
Distant view of new orchard.

K-2535. July 26, 1958. Near Minsk. On New Life Collective
Farm. Unloading green oats and vetch at dairy barn.

small horse-drawn wagons. They have a round concrete pit silo. The other farm buildings are made of wood and are not in very good repair.

I look at their tractors. They have 7 wheeled tractors and 4 crawlers. There are many small wagons for hauling. There is a small store on the farm. I am told that they will soon start new buildings for the farm families. They certainly need them.

We must start back to Minsk after only 35 minutes on this farm! Near Minsk I see an operating brick yard using material from the underlying marine clays.

We call briefly on the Minister of Agriculture of Belorussia. He tells me that a third of the collective farms and all the state farms now have milking machines. They recognize the need for more fertilizer and two plants are being built in Minsk. We discuss the need for good experimental design; and they say they realize the need for randomizing the plots for better statistical analyses. They also plan to design somewhat lighter machines for seeding. After the conference I note that a Tass correspondent was present, but all was very pleasant.

We then go to the airport and find that there has been some confusion over reservations. We have to leave behind Nelson, Thorne, Donnan, and Cline. Mrs. Nina M. Ryabova was extremely friendly, but apparently doesn't feel like talking so freely as she would like. Our Belorussian friends see us to the plane and the wheels are off the ground for Kiev at 11:50 a.m.

small horse-drawn wagons. They have a round concrete pit also. The other farm buildings are made of wood and are not in very good repair.

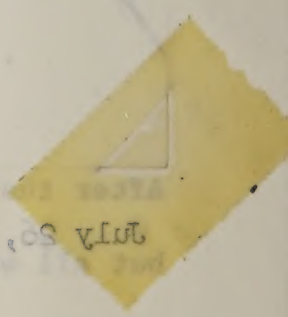
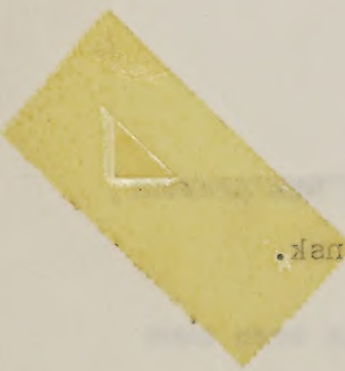
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July 26, 1958. At the Ministry of Agriculture in Minsk.
 Skoropanov, L, and Lupinovich, R.



6
K

10-24

July 26, 1958. At the Ministry of Agriculture in Minsk.
Shorogov, I., and Iupinovich, R.

We also go to the airport and find that the plane
condition was satisfactory. The plane is a Soviet Union
Dushan, and I think, was a Soviet Union plane.
but apparently there's a lot of trouble at the airport.
Our Belorussian friends are in the plane and the plane is
the ground the plane is in the air.

It would seem to me from the plane some of the podzolic soils are tending toward Brown-Forest soils. About one-fourth of the cover is woodland. The fields have a roughly rectangular pattern except for road and stream boundaries. The small family plots are darker green in color and have heavier yields than the other fields. It seems to me that there are far more public earth roads than are really necessary. These are probably an inheritance from an earlier pattern.

At 15 minutes we pass a small city.

In 25 minutes about a third of the cover is scrubby forest. The soils appear to be quite sandy with some irregular wet areas. Perhaps they are from cover sands of glacial origin. At 35 minutes out the cover is about one-third thin woodland and the soils seem to be very sandy with a fair proportion of wet soils only partly drained.

At an hour out we are roughly parallel to the Dnepr River. I see some stripcropping in straight lines, mainly east and west. I cannot tell whether the soil is a leached Chernozem or Gray-Forest. Most of the fields have a grayish-yellow surface in a complex pattern with dark wet soils. As we go on the amount of scrubby native forest along with some planted forest increases, apparently on sandy soils.

At 70 minutes we are back on darker colored soils. Possibly some of these are leached Chernozem, but more likely some sort of Gray-Forest or podzolic sandy soils. At 75 minutes we are over a small town and I see a few scattered farms near the city of Kiev.

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Perhaps these are simply workers' homes on fair-sized lots.

The wheels are down at Kiev at 1:11 p.m. We are met by Mr. Alekseevski, Vice-Minister of Agriculture of the Ukrainian Republic; Mr. S. M. Perekhrest, Director of the Ukrainian Institute of Water Economy; Mr. Alexander S. Skorodumov, Manager of the Soil Erosion Control Laboratory; and Mr. I. I. Basov, Vice-Minister of Agriculture for soil mapping.

We go to the Intourist Hotel. We have lunch and change some money. We take a short trip in the city where I have the experience of buying three Ukrainian ladies' blouses. Although this is a very old city, much of it looks new now since the larger part of its center was destroyed during the German war and has been rebuilt since 1945. The streets are wide and clean and the city seems a bit brighter than either Minsk or Moscow. This Saturday afternoon many people are out on the streets.

We are taken to an interesting old monastery with the name Kiev Pecherski. This was said to have been at one time the center of the Christian religion for a wide area including most of old Russia. Here one sees wanton destruction of the main cathedral by the Germans. This is a great pity since the cathedral was an excellent example of architecture from the 11th century.

We go down into the catacombs where the monks first started to live and study in 1025. In these catacombs are many relicts (or mummies) of famous monks and churchmen. In some of the cubicles are very nice paintings from the 15th to through the 18th century. In order to go down here one must carry candles, which apparently help finance the monastery. There are quite a few monks about.

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The chapel is very crowded and many people cannot enter. Most of the people that I can see in the chapel are more than 45 years old, although there are some young people. Nearly all or all of the women wear white kerchiefs over their heads.

Our Intourist guide says that there are three active cathedrals in Kiev, several local churches, and a theological seminary for Orthodox priests.

We take a short look at the St. Sophia Cathedral which is now used as a museum. Unhappily, it is closed. We have a little drive along the Dnepr River and return to the hotel about 7:30 p.m. The others had come in about 5:30 p.m. after a very choppy flight. Happily, they had brought with them a combined soil map and farm plan for a collective farm near Minsk which I had been so anxious to get.

After dinner I do my washing and am ready for bed at 10:30.

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July 27

This is Sunday and I hear early church bells. It is a nice sunny morning and I go for a short walk and look in the shop windows. Book stores and stores for sporting goods are quite prominent. Relatively, womens' dresses are not expensive, but mens' suits seem highly priced. I note a not very good one for 1,800 rubles. I see very small loaves of bread in the window for 60 kopecks and large ones for 2.7 rubles.

After breakfast our friends come, including Professor Skorodumov, manager of the Soil Erosion Control Laboratory, and agricultural officers of the Kievskaya Oblast. At 9:45 we leave in a small bus for the collective farm called October. We need to drive about 30 kilometers north of the city. Along the south side of the Dnepr River are high bluffs of loess, resembling those along the Mississippi and Missouri rivers. They have worked these steep bluffs into two or three steps in order to handle the drainage water through masonry chutes and to prevent slides and gullyng. The slopes are well planted with trees and shrubs. We cross the Dnepr River and pass over a wide, low sandy terrace that is flooded each year. Right near the river a large strip of riverwash is used as a beach for recreation. Then we go onto a second terrace that is also very sandy. Here there are excavations for sand used in glass making. Locally this is called a "slightly" podzolic sandy soil. The original cover was mainly pine and much of it is still in pine, scrubby because of war damage.

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soil. The original cover was mainly pine and much of it is still in pine,

scrubby because of war damage.

We pass Brovari, a rayon headquarters. Here there is a double-track railroad. We turn off on an earth road and soon come to the headquarters of the October Collective Farm. We meet in a reception room, which is very clean and nicely furnished.

The chairman, Mr. Ivan M. Kolbasinski, speaks:

The farm was originally organized in 1928 and by 1934 all of the peasants were organized in a collective. Prior to World War II, the land occupied by this farm was included in 4 farms, not large enough to use machines. All operations were handled with animals. The buildings on all the farms were destroyed in World War II. It was difficult to start again because the Germans took all the animals. Not until 5 years after driving out the Germans was it possible to restore normal operations. Then in 1950 it was decided to unite the 4 original farms into this one now called October.

The farm now has 6,400 hectares of which 3,800 are under crops and 750 under pasture and meadow crops. The areas of crops are given to us as follows, in hectares:

Winter rye and wheat	1,200
Oats, buckwheat, and barley	800
Potatoes	500
Vegetables, including cabbage, tomatoes, table beets, cucumbers, carrots, and onion	200
Orchards	170
Fruit trees nursery	52

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500	Potatoes
	Vegetables, including cabbage,
	tomatoes, table beets, cucumbers,
200	carrots, and onion
170	Orchards
52	Fruit trees nursery

This farm supplies all farms about with small fruit trees, which are an important source of income. They use lupine a good deal on the poorer soils to improve fertility.

They have dual purpose cattle and other animals as follows:

Cattle	1,300 of which 550 are milk cows
Pigs	2,000 to 3,000
Poultry	11,000
Beehives	350
Horses	350

The farm and the buildings are fully electrified. This year all their machines were purchased from the machine and tractor station. These include 22 trucks, 14 tractors, 9 combine harvesters, 1 car, and the other necessary machines for tillage and the like.

On this farm are 1,200 families and houses. Of the total population of 5,000 there are 1,400 able-bodied workers. Women 17 to 55 years old are considered able-bodied workers although they can continue to work some after that age if they want to. Years for men are 17 to 60. Some of the boys can work during the harvest. (Many young men must be in the army now.)

The average size of the individual family plot is .5 hectare and they range from .3 to .6.

This year they are using about 1,050 tons of fertilizers. They buy the primary materials and mix them as needed. As near as I can make out, according to the soil map, they need 350 tons of ammonium sulphate, 600 tons of superphosphate, and 150 tons to 200 tons of

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The average size of the individual family plot is 2 hectares

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make out, according to the soil map, they need 350 tons of ammonium

sulphate, 600 tons of superphosphate, and 150 tons to 200 tons of

30 percent potassium salt. The ammonium nitrates cost 150 rubles per ton; the superphosphate (18 to 20) 40 rubles per ton; and the potassium salt 50 to 60 rubles.

The potatoes respond very well to potassium. They have expanded their acreage considerably and also have increased the need for more potassium salt to 400 tons.

According to their records, the annual rainfall is between 550 and 600 millimeters. We are told that the soils are quite variable. The majority of the soils are called light clay loams. We would probably call them fine or very fine sandy loams. The organic matter is 1.5 percent. Then they have dark-colored soils in the lowlands, and some Alluvial soil near a small river.

We then discuss milk production. Last year they had an average of 3,521 liters per cow, or 28.9 tons of milk per 100 hectares. Their maximum yield from one cow was 6,500 liters.

The average yield of wheat is about 18.5 centners per hectare. But last year was better and they had 33.5; this year they expect 28. Because of using lupine and fertilizers regularly, they expect to raise the average yield of wheat to 30 centners (3 metric tons) per hectare, or 45 bushels per acre.

They show me a map interpreted from the soil map and tests for the need of lime. They have 4 units on this map as follows:

- (1) None required (only a small area)
- (2) 1 to 2 tons per hectare
- (3) 2 to 3 tons per hectare (This is the largest area on the farm)
- (4) 3 to 4 tons

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They tell me that the farm as a whole received 8,200,000 rubles gross income. Of this the collective farmers received 4,200,000 rubles. For each work-day unit they received:

2.0 kilograms of wheat and rye

2.5 kilograms potatoes

1 kilogram vegetables

2.5 kilograms of fodder

7 rubles in cash

This year they expect to do better and to have 10 instead of 7 rubles in cash for each work-day unit.

I ask about the prices received and they give me the following "fixed" prices, in kopecks per kilogram:

Potatoes	35
Vegetables	60
Wheat	29
Rye	27

The "second" price for wheat is given as 1.1 rubles per kilogram, and for rye at 95 kopecks per kilogram.

The low prices are those for the quota or required delivery to the government and the second prices are for those delivered that are above the quota. This first price is sometimes called the "delivered" price and the second the "fixed" price. Of course, actually all prices are fixed. As mentioned earlier in these notes, a decision was taken by the government this year to make just one price. This will have the

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effect of increasing farm income and the preliminary estimates on this farm suggests that they will gain a million rubles by this change. They tell me that their main effort on the farm is to supply vegetables, fruit, and milk.

The farm bought the machines with its own money. Other farms have been given credit for two or three years.

It seems to me that it must take a lot of bookkeeping for a farm of this sort. They tell me that they have 18 persons for this work. There are 11 persons on the management board, 9 of whom work in the fields also. The farm has one agronomist.

In Kiev there are special selling organizations for milk and vegetables. The farm delivers the milk to the plant and to the shops as suggested by the selling organization. The grading of fruits and vegetables is done on the farm.

We get into the bus for a visit to the fields. Now the wind is blowing very hard. We first go out into a grain field and I look at the soil -- a Gray-Forest soil on the third terrace of the Dnepr River. The soil is nearly level, except for a slight mezzo-relief, and is well drained. (K-2537)

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A_{1p} 0 - 7" Dark grayish-brown to black, very fine sandy loam to silty loam. Very but weakly friable.

A₂ 7 - 10 1/2" Transitional

B₁ 10 1/2 - 14" do

B₂ 14 - 30" Brown (7.5YR 4/4) and strong brown (7.5YR 3/6) mottled silt loam rich in very fine sand. Irregular nodules on peds of light brownish-gray.



K-2537. July 27, 1958. Near Kiev. View where soil profile is described on third terrace above the Dnepr River on October Collective Farm.

I see a field with volunteer rye now being plowed and exposed in one operation for winter cereal. The structures do not look too well. They would benefit by some supplemental irrigation. The potatoes are small. Some have nitrogen deficiency. I would say that the deficiency is due to careless spreading of manure.

Some of the low spots on the field appear to be a bit more stony. Very little erosion or soil blowing is evident.

K-2537. July 27, 1958. Near Kiev. View
where soil profile is described on
third terrace above the Dnipro River
on October Collective Farm.

A _{1p}	0 - 7"	Dark grayish-brown (10YR 4/2) very fine sandy loam to coarse silt loam. Firm but easily friable.
A ₂	7 - 10½"	Transitional
B ₁	10½ - 14"	do
B ₂	14 - 24"	Brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottled silt loam rich in very fine sand. Irregular coats on peds of light brownish-gray (10YR 6/2). Weak to moderate, medium blocky. Easily friable. Slightly vesicular. No clay skins. Some threads of white free silica (?)
B ₃₁	24 - 31"	Yellowish-brown (10YR 5/4) silt loam to light silt loam as above, with weak coarse blocky structure, with vertical threads of (10YR 6/2) silty material. Very friable.
B ₃₂	31 - 42"	Light yellowish-brown (10YR 6/4) silt. Very friable mass.
C	42+	Light yellowish-brown (10YR 6/4) compact but very friable silt. Upper boundary very sharp and may represent an old water table boundary. A few krotovinas and a few calcium carbonate concretions.

There are no carbonates above the C. The pH of the surface soil is said to be 5.5. The roots go down to the C but not far into it.

I see a field with volunteer rye now being plowed and harrowed in one operation for winter cereal. The strawberries do not look too well. They would benefit by some supplemental irrigation. The potatoes are uneven. Some have nitrogen deficiency. I would say that the unevenness is due to careless spreading of manure.

Some of the low spots in the field appear to be a bit more clayey. Very little erosion or soil blowing is evident.

Very little erosion or soil blowing is evident.		Some of the low spots in the field appear to be a bit more clayey.		that the unevenness is due to careless spreading of manure.		potatoes are uneven. Some have nitrogen deficiency. I would say		too well. They would benefit by some supplemental irrigation. The		in one operation for winter cereal. The strawberries do not look		I see a field with volunteer rye now being plowed and harrowed		is said to be 2.5. The roots go down to the C but not far into it.		There are no carbonates above the C. The pH of the surface soil	
C		42+		Light yellowish-brown (10YR 6/4) compact but very friable silt. Upper boundary very sharp and may represent an old water table boundary. A few krotovinas and a few calcium carbonate concretions.		B32		31 - 42"		Light yellowish-brown (10YR 6/4) silt. Very friable mass.		B31		24 - 31"		Yellowish-brown (10YR 5/4) silt loam to light silt loam as above, with weak coarse blocky structure, with vertical threads of (10YR 6/2) silty material. Very friable.	
B2		14 - 24"		Brown (7.5YR 4/4) and strong brown (7.5YR 5/6) mottled silt loam rich in very fine sand. Irregular coats on beds of light brownish-gray (10YR 6/2). Weak to moderate, medium blocky. Easily friable. Slightly vesicular. No clay skins. Some threads of white free silica (?)		B1		10 1/2 - 14"		do		A2		7 - 10 1/2"		Transitional	
A1p		0 - 7"		Dark grayish-brown (10YR 4/2) very fine sandy loam to coarse silt loam. Firm but easily friable.													

Here as elsewhere they use a great deal of green freshly cut fodder that is hauled to the feeding areas, mostly in small horse-drawn wagons.

We stop near a good field of wheat that may run 45 bushels to the acre. It is a soft winter wheat with short straw and good heads. I finally estimate 3 tons per hectare and the farm manager 3.5 tons per hectare, and maybe he is right. (K-2538)

We stop briefly to look at the milking area for the dairy cows. These are long sheds without sides that are simply covered stalls (K-2539). Just now a truck load of milkmaids comes up and it is interesting to watch the cows come up to be milked. Milking machines are used.

I see some wine grapes and these are made into wine for local use on the farm. I see another field of good-looking strawberries although they are a bit weedy. Nearby is a good-sized planting of currants.

I look hurriedly at a Humic-Gley soil that was obviously quite variable to begin with and has been disturbed by ancient building and by long use for crops and pasture. Locally this soil is called a Meadow-Chernozem with gley. In the slightly uneven plain are small marshy spots. (K-2540)

A ₁	0 - 24" (+ 12")	The horizon may have a lower boundary at 12" or 36". Very dark brown to black (10YR 2/1 to 2/2) silt loam. Mixed weak blocky and granular.
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K-2538. July 27, 1958. Near Kiev. Wheat on October
Collective Farm. (Left is Chairman Ivan M.
Kolbasinski: right is chief agronomist on farm.
Yield 3.0 to 3.5 tons per hectare).

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Yield 3.0 to 3.5 tons per hectare).

(B) In a few places in the pit I see a suggestion of a weak B between the A and G.

G 24+ Very dark brown (10YR 6/2) silt loam with yellowish-brown (10YR 5/4) mottles. Structureless but friable.

The soil has many krotovinas and is calcareous throughout.

Although the soil is cropped as it is, it would obviously benefit from tile drainage.

Then we are taken to a nice looking orchard of apples and pears. Nearby I see a good plot of "semi" sweet corn grown on a Gray-Forest soil that is somewhat like the first profile. I walk past a large planting of grafted apple seedlings. These little trees are sold to other collectives at 4.5 rubles each. They are now selling about 90 thousand per year.

They get 4 rubles per kilogram for apples in the farmers' market. As the season advances prices are lower. This horticultural work looks good and is said to account for roughly one-half of the income for the farm.

Now we sit down in the orchard to a table loaded with fruit and wine. I am much impressed by this farm and its management, but certainly there are too many people on it for the acreage and for the production.

We drive back into Kiev. Around the city here too there is much new building of factories and apartments.

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K-2539. July 27, 1958. Near Kiev. Milking and feeding area for dairy cows on October Collective Farm.



K-2540. July 27, 1958. Near Kiev. Humic-Gley soil where profile is described on October Collective Farm.

K-2540. July 27, 1958. Near Kiev. Hamko-Vley
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K-2539. July 27, 1958. Near Kiev. Milking
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We are back to the hotel at 3:15 p.m., for a slow lunch-dinner and leave for the agricultural fair at 5:40 p.m. Now it rains. This fair is modeled somewhat after the one in Moscow. It includes all agriculture and industry. We visit the main agricultural exhibits where we are reminded that there are 600,000 square kilometers in the Ukraine. In the north the podzolic soils are relatively poor. Animal husbandry dominates, mainly dairying and pigs. Potatoes and lupines are widely grown partly for the pigs. Here the rainfall is about 550 to 600 millimeters.

Next is the forest and steppe with Gray-Forest soils and Chernozem where the rainfall is 450 to 500 millimeters. Sugar-beets are very important and also winter wheat and corn.

The steppe area covers the southeastern part of the Republic. The northern part of this region has 450 millimeters of rain and the southern 300 millimeters. They have 8 million hectares of winter wheat, said to be high in protein, around 18 percent. They claim that their Ukrainian variety is better than the Manitoba one. They also have considerable corn. They speak briefly of the Carpathian Mountain where there are orchards and some animal husbandry. In the Crimea they have orchards, vines and tobacco.

It is said that the first task of each of the research institutes in these several regions is to make soil maps in order to develop a sound basis for research and for devising new methods and extending

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the information to the farmers. We are shown many pictures of tillage practices including the operation of machines to windrow the snow in winter in order to hold the maximum amount on the fields.

We take a rapid look at exhibits on soil conservation that outline the various crop rotations, methods of forest planting, use and construction of terraces, and the use of drop structures.

We are told that soil blowing affects some 200,000 hectares and shelterbelts are emphasized. Sand dunes are stabilized by planting pine trees with peat as a soil conditioner together with other shrubs, especially willow, to protect the young trees. The exhibit on shelterbelts shows rows of trees on all field margins and with cross rows, except for gaps at the ends for the passage of machinery and some wind.

This whole exhibit covers about 900 acres of which 380 are under forest. Each agricultural pavilion has land for demonstration. We drive by these plots and see many kinds of crops, fruits, shelterbelts, crop rotations for the various regions, machinery, fish ponds, poultry, cattle, pigs, goats, and so on. Carp are grown in the fish ponds on collective farms.

We are shown a large-scale model of the plans for the Dnepr River involving 14 dams for 2,700,000 kilowatts of electricity and for irrigation. They also have power stations on the small rivers for another 800,000 kilowatts. In this short lecture I am not sure what is done and what is planned. They also have navigation on the

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river from the sea to Gomal, a distance of 1,400 kilometers. I am told that somewhat less than half the farms are electrified and that farms get about 10 percent of the electric energy. I suspect this is high.

We return to the city and go to the cinema to see Dostoyevski's The Idiot. This is a beautiful film in color, very well directed and very well acted. It reminds me of some of the films, such as The Grand Illusion, directed by Renoir. Then we are back to the hotel for a late supper and a bit late to bed.

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July 28

This is a gray rainy morning. First we are to see the Minister of Agriculture, Mr. Spivak, and then go in cars to Poltava.

We begin our meeting in the Ministry at 9:25. The Minister says that Ukrainia has well developed agriculture and industry. They produce 150,000,000 tons of coal, 20,000,000 tons of cast iron, 19,000,000 tons of steel, and 19,000,000 tons of rolled steel. They have a big chemical industry and produce many heavy machines including machine tools.

At the present time 46 percent of the labor is in industry and service and 54 percent on farms. Obviously, the farms are over populated. I point this out and the Minister says that the proportion in industry will steadily increase. New factories are being built. He promises to give me figures on population distribution as projected ahead.

(We need to start drinking wine now at 9:35).

He tells us that 72 crops are grown in the Republic. Legumes and winter wheat account for 11,000,000 hectares. Other main crops are as follows:

Corn, 6.5 million hectares

Sugarbeets, 1.33 million hectares

Sunflowers, 1.00 million hectares

Potatoes, melons, etc., 2.0 million hectares

Fiber flax, 0.2 million hectares

They also grow tobacco and shag, Nicotiana rustica, which accounts for 60 percent of the production of the USSR.

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They also grow tobacco and shag, Nicotiana glauca, which accounts for 60 percent of the production of the USSR.

They expect to have one million hectares under orchards and vineyards according to the seven-year plan beginning in 1959. Now 220,000 hectares are irrigated. Some works are completed, mainly in the south. Irrigation, he says, is a recent development; there was no irrigation before the Revolution. Thirty thousand hectares will be newly irrigated this year and 180,000 more during the seven-year plan. These new projects will be much larger than the old ones, including a large plan for the northern Crimea. He says that this plan is not entirely firm and they are considering 250,000 new hectares as a possibility under the plan. I ask him what would be irrigated and he mentions rice, potatoes, vegetables, orchards, vineyards, small fruits, and perennial grasses. Then he says, "crop rotations," so I guess he gets everything.

Now 1,030,000 hectares have been drained. The seven-year plan calls for the drainage of 650,000 more hectares. This he said might need to be reduced to 450,000.

The farms are expected to pay back in 2 or 3 years all costs of the irrigation systems. I don't presume that this includes the large dams but apparently it does include the canals and small structures. The government pays the salaries of the engineers and design costs. They expect that 20 percent of the irrigation will be by gravity flow and about 80 percent by pumping, of which 5 percent or a little more will be applied by sprinklers.

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Animal production will be increased 2.5 to 3.0 times present production. The main target is to improve practices through better rotations, more fertilizers, and better varieties. They plan to increase shelterbelts some. He tells me that in the south the Chernozem soils give 4 tons of wheat per hectare in good years (about 60 bushels per acre).

They have 84 experimental stations in Ukrainia, of which 17 are research institutes. Each one has laboratories to determine what fertilizers are needed by farms. In addition, each of the 750 "micro-regions" has its own agro-chemical laboratory.

The Minister is very friendly. He is planning on going to the United States next September. As we leave he gives me a table of projected population as divided between the towns and the farms:

Year	Percent population	
	Towns	Farms
1913	19.3	80.7
1939	20.3	79.7
1956	40.0	60.0
1965	60.0	40.0

After this pleasant talk we return to the hotel and pack. We have a long and wasteful wait for the Ministry cars. Excuses are that since yesterday was Sunday, a rest day, the cars could not be gotten ready then. On top of that there was supposed to have been a flat tire this morning.

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While waiting for the cars I talk briefly with a Florida couple staying at our hotel. They complain rather bitterly about the bad beds, especially since they are paying \$35 a day apiece. Too bad! My bed was fine.

We are ready to leave at 12:30 for Poltava in a light rain. These Zim cars do not have much room for baggage because the boys carry reserves of gasoline. We cross to the north side of the Dnepr River over the beautiful, all-welded bridge. We pass over the first terrace, which is 2 to 15 kilometers wide. There are some wet meadow soils but mostly podzolic sands and sandy loams. We then go up to the very sandy second terrace of weakly podzolized soil under pine forest. This appears to be 3 to 15 kilometers wide. The forest is scrubby since most of it was cut by the Germans. I see some plantings of pine (Pinus sylvesterus.) Some stands have oak also. Wet sandy soils have birch.

At least we are starting out on a nice black-top road with young trees along the side. I see a few orchards. In the very sandy areas with dune relief, willows are used to protect the young pine. Later these are cut out for making baskets.

(I am beginning to think these Zim cars are very good for country travel. And the clocks work!)

As we move onto the third terrace I see soils something like those on the farm yesterday, perhaps a bit more silty. Cereals have just been harvested. It rains.

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We pass Borispol, a rayon center, at 1:10 p.m. I see a grassed airfield here with many planes. The machine and tractor station here is being converted to a repair station. Most of the small home plots have vegetables, sunflowers, and fruit. A few have flowers.

Beyond in the rather open country are cereals and corn, and perennial grasses on the low-lying Humic-Gley and Bog soils. Apparently all of the cereal straw is saved. Now there is a mixture of deep, leached Chernozem and podzolic soil. We pass villages where nearly all the houses have thick thatched roofs. And then more planted forest on sandy podzolic soils. But mainly we drive over a large area of the leached Chernozem with some Humic-Gley. The landscape is open and nearly treeless. The crops are mostly small grains. I see corn, thick and short for fodder. This is a beautiful landscape of undulating leached Chernozem with some shallow closed basins and a few wooded sandy podzolic areas. We pass another collective farm with new long cow sheds but most of the homes are small and have thatched roofs.

We make a short stop in a wide wet area with peat now being reclaimed with mole drains for a controlled water table. A canal is built through it. Beyond is a complex of leached Chernozem and sandy podzolic soil. We cross the Nedra River at 1:55 and through pine forest about 10 to 20 feet high on sandy soils. The farming is more diversified, with corn, sunflowers, potatoes, and a little fruit as well as cereals. A few new shelter strips here are mainly oak.

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As we go on, the Chernozem is darker (said to be 3 to 3.5 percent organic matter). The many nearly level areas appear to be a bit gleyed. We pass the 128 kilometer post at 2:30. I see essentially no erosion. We pass a small area of peat being cut for fuel. We pass the road to Piryatin at 2:50 p.m. (K-2541) As we pass a farm I see elderly women along the road each herding a cow, probably from the family plots. The houses are thatched and have whitewashed walls.

We go now from the third terrace of the river onto the plateau. The thick Chernozem from loess is richer in humus and is said to be more than one meter deep. The landscape is nearly level to gently undulating. Droughts are said to be uncommon. Some of the soil is a bit wet. Here there are sunflowers, cereal, fallow, and some potatoes. I also see some fruit trees and corn.

Along the road are very few signs except for large colored pictures of agricultural, industrial, and historical scenes. Some of these are for urging people to do better and I suppose some for education.

We are said now to be moving into the "forest steppe zone." We see a lot of mud as we pass Lubny at 3:50.

We cross the Sula River which has a wide wettish flood plain. I see cereals, flax, hemp, and corn on the better drained soils. On the undulating Chernozem beyond are cereals, potatoes, sunflowers, fallow, and flax. There are some very large fields of wheat. The rain has stopped. My guide says that the season is cooler and rainier than normal.

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K-2541. July 28, 1958. East of Kiev. View of Chernozem soil from high railway grade.



K-2542. July 28, 1958. Near Mirgorod. Young roadside shelterbelt.

K-2541. July 28, 1958. East of Kiev. View of Chernozem soil from high railway grade.

K-2542. July 28, 1958. Near Mirgorod. Young roadside shelterbelt.

I see people plowing directly up and down a fairly strong slope. I point this out to my guide and he says, "But that is forbidden!" Collective farms here are said to be quite wealthy. Most of the houses have near them little piles of peat bricks for fuel. There are a few new windbreaks but not many. I photograph one. (K-2542)

We pass Mirgorod at 4:06 (Gogol wrote about this place.) I notice small garden plots between the pavement and the right-of-way boundaries. I am told that farmers can have these in compensation for removing snow and looking after the roadsides. We cross a small river with a grassy flood plain used for pasturing dairy cows.

Out in the plain I see some small mounds about 20 feet high. Some of them have triangulation towers on them now. They are said to be ancient "watching" hills made about 500 years ago.

We pass a small ravine, well grassed with diversion terraces. (Added later: I found these to be rare in the Soviet Union.) The roadside seems lush and green for Chernozem in mid-summer.

As we go on there is more relief and some hazard of both sheet and gully erosion.

Manure is hauled into the fields and put in piles as described by Palissy in the 17th century in France. We pass through the valley of the Psel River. The well drained soils on the terrace are Chernozem from loess, perhaps partly reworked by water. Crops are hemp, sunflowers, corn, and flax with grass in the moist places. The sandy

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parts of the terrace have a few pine trees. The collective farms here are said to be "wealthy." The people live in small, nearly square houses with very few tiny windows and thatched roofs. Some of the walls are whitewashed and some are blue. A few new houses are larger and have steel roofs, but even these do not suggest "wealth" to me. But of course, this is a comparative term.

We are soon back into a rolling plain with some erosion hazard. The young shelterbelts should be supplemented with diversion terraces. The corn is short and somewhat nitrogen deficient. The soils are said to be Degraded Chernozem; perhaps, or maybe an oromorph phase of ordinary Chernozem.

Here, 40 kilometers northwest of Poltava, we are met by the agricultural administrative officers of the Poltavskaya Oblast. They lead us to a collective farm named after Stalin. A part of it touches the road. Here on the margins of the river terrace the Chernozem has slopes up to 30 percent. My guide calls it "restored Chernozem." This is really kind of silly. The soil on the steep slopes has had some erosion and is now fairly well stabilized with grass, trees, and shrubs. (K-2543) The woody vegetation is used to stabilize the gullies. Unhappily there are no diversions. But of course this has not recreated the Chernozem A horizon. The lowlands along the river have been drained.

There are said to be 7,000 hectares in this farm including uplands, escarpments, and alluvial plains. They grow grain, sugarbeets, dairy cattle, sheep, swine, and poultry. The dairy cattle are fed silage, chopped straw, cake from sunflower seeds, and sugarbeet waste.

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After this day we have been very busy. In the afternoon, on an excursion, we drive toward the north. The road is very good. This farm headquarters is located in a valley where simple diversions and changes could be very helpful to the workers.



K-2543. July 28, 1958. Near Poltava. View of terrace slope on Stalin Collective Farm. Plantings of trees and shrubs to prevent gullies. No diversions. Probably somewhat eroded Chernozem.

We saw some plantings here and suggested to be 10 years old. The sand was blowing dangerously and we were very concerned. We are on the left side of the terrace slope and there is a small stream about 12 kilometers away. The terrace work on the very sandy soil was started first with willows and then with oaks. The level grade was made for lupines. The sand is said to be 12 meters deep. I am sure that the oaks indicate a sandy soil, but this is doubtful to me.

Chernobyl K-2543. July 28, 1958. Near Poltava. View of terrace slope
on Stalin Collective Farm. Plantings of trees and
shrubs to prevent gullies. No diversions. Probably
somewhat eroded Chernozem.

After this stop to view very ordinary plantings on an escarpment, we drive toward Poltava. I am told that the direct road to this farm headquarters is impassable. We cross another valley where simple diversions and chutes would be very helpful to control gullies.

Then to my surprise we pass a nice apple orchard and some pears. But then a part of the orchard is not so good. I see more potential gullies needing diversions. As we approach Poltava I see more new shelterbelts or windbreaks with 4 or 6 rows of trees.

We bypass Poltava and continue east. We enter onto another very sandy second terrace with natural pine and shrubs and planted pines and oaks. We turn to the south on a poor earth road that is probably better than the silty ones after all this rain.

But the road gets worse. This is turning out to be a wild ride. It is now 6:25 p.m. and we are still out in an area of mixed pine woods and poor pasture.

We pass some pretty sticky villages and come to a collective farm headquarters called Stalin. I had supposed this is part of the one we saw from the road; but I now think it another. The forest plantings here are supposed to be 20 years old. Sometime ago the sand was blowing dangerously but now it is under control. Here, we are on the left side of the Vorksla River which has a flood plain about 12 kilometers wide. The reforestation on the very sandy soils is started first with willows and then pine. The level areas are used for lupines. The sand is said to be 12 meters deep. I am told that the oaks indicate clayey soils, but this is doubtful to me even if

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we substitute "silt" for "clay."

They grow corn and buckwheat here but rye is said to be the best crop.

I meet the chairman of the farm, Ivan S. Dyakonenko. He shows us a field of sugarbeets on a smooth slightly wettish sandy loam soil that is not artificially drained. The beets look good. He tells us they use 20 tons of farm manure per hectare and .7 tons of mineral fertilizer consisting of superphosphate, sodium nitrate, and potassium chloride.

For corn they use 10 tons per hectare of "well done" farmyard manure and .15 tons of superphosphate and .15 tons of sodium nitrate. (Added later: This is probably a translation error for ammonium nitrate). He claims yields of 4 tons of grain per hectare and 40 tons of sugarbeets. Last year they had 49 tons of sugarbeets on some fields and an average of 33.7 tons on 100 hectares.

Across from the sugarbeets I look at the rather lush family plots of corn, string beans, and squash all planted together. (K-2544)

I get a little mixed up about this farm and whether or not it is a part of the one near the main road. The chairman says that he has 6,000 hectares and that he follows two ten-year crop rotations. Probably this is a different one. He shows us a combined soil map and farm plan map. Although most forest land is in government preserves this farm has 580 hectares of forest from which the farm sells products.

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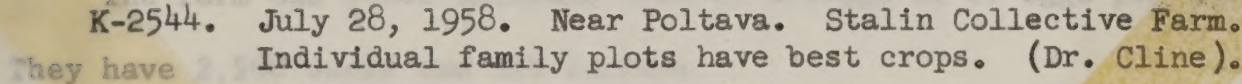
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K-2544. July 28, 1958. Near Poltava. Stalin Collective Farm.
Individual family plots have best crops. (Dr. Cline).

The chairman has been in charge since 1928 except for the war years. He has received the Order of Lenin and over 40 other members have had awards for their work. There are 988 families. 880 work on the farm and many others work in the town.

The Germans destroyed every building. Immediately after the war people lived in holes in the ground.

Their crops are roughly as follows:

Corn for grain, 650 hectares

Potatoes, 210 hectares

Sugarbeets, 100 hectares

Vegetables, 90 hectares

Besides there are unrecorded areas of small grains and perennial grass.

They have 520 milk cows averaging 3,340 liters. This year they have had an average of 1,900 liters from January 1 to July 20. Each day they deliver about 5 tons of milk to the processing plant.

Pigs number 1,500, of which 130 are sows.

They have 658 sheep, both black and white fleeces of fine wool.

The farm has 4,000 chickens with an average of 97 eggs per hen.

They have 2,500 ducks and 150 turkeys.

They are starting with 40 silver foxes.

Finally they have 200 beehives.

The manure is broadcast from heaps hauled into the field. Fertilizer is applied by seed drills and some by plane. About one-third of the area gets fertilizer in rows, about two-thirds is fertilized in the fall by drills or by plane on the surface and then plowed down. Corn and sugarbeets get side-dressings of nitrogen and phosphorus after the crop is up.

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(While we discuss this by the road a small horse-drawn wagon goes by with green-cut forage).

We go to the manager's home for food, drink, and toasts at 7:30 and arise at 9:00 p.m.

Then we start back for the 40 kilometers of terrible road. The driver tries a different way and gets stuck in the middle of a village. We turn around and take another road and wait for the others. I notice that few of the farm houses in this village have a light. What a terrible road!

We get back to the hotel in Poltava at 10:30. I am so tired I can hardly walk. As I start to undress I am dismayed to learn that I must go to another Russian banquet put on for us by Mr. Taran, chief agricultural officer of the Poltavskaya Oblast! Never in my life have I felt less like a banquet. Further it is about 3 blocks from the hotel and we have the usual delays.

I can't describe this banquet. I am finally back and ready for bed at 12:15, and thus passes one day to another.

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July 29

I am up about 6 o'clock on a bright and sunny morning. I take a short walk along the main shopping street. People here are only fairly well dressed. I am back at the hotel and wait for our hosts who are supposed to be here at 8:30. I resent the time I waste in waiting.

We go down to the restaurant for breakfast. Then it rains. Breakfast is not over until 10:15! I sometimes wonder if part of these delays are not planned so that either it is too dark for us to see or we are too tired.

We go to the office of the agricultural administrator of the Oblast. The farms here are growing mainly cereals and corn along with sugarbeets, dual purpose cattle, pigs, sheep, and poultry. He gives us a summary of production in the Oblast. I notice pictures of Lenin and Krushchev in the office.

They tell me that all the corn grown is hybrid with two main varieties VIR-25 and USPEKH (Success).

He says that soil erosion is serious in this Oblast and that there is some soil blowing. About 120,000 hectares have some erosion hazard. This amounts to 3.4 percent of the area of collective farms. (Added later: In comparison to the United States, the erosion hazard is much less. The most critical places are along the ravines branching off from entrenched rivers.)

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He tries to explain to us the general principles of the crop rotation systems. Winter wheat is sown commonly after three previous crops. For example, they may have clean fallow from either autumn or spring plowing and perennial grasses prior to the winter wheat. Winter wheat often follows corn harvested green for fodder. Clean fallow is cultivated to hold as much water as possible. (Weeds are a serious problem here.) The last cultivation is at the depth of sowing. After harvesting hay in June or July plowing is about 20 to 24 cm. A roller follows the plow. They use roughly the same practices on other crops but the timing is different. The recommendation is to plow immediately after harvesting wheat. If for some reason that cannot be done, the field remains in stubble.

In this oblast there are 731 collective farms. Only two machine and tractor stations remain in operation. The others have been reverted to repair stations. He says that another administration looks after the state farms.

Much of this discussion is a waste of time. I strongly object to lunch at 4 and then drive 350 kilometers to our next overnight stop.

At 11:00 we go to the Poltava Provincial Agricultural Experimental Station. It is said that this station was started 74 years ago by the Poltava Agricultural Association. For some 15 years or more they asked for help and the Moscow government refused. At first they had only 23 hectares. Until the Revolution the station had

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limited facilities; yet some local problems were solved, especially on tillage, fertilizer use, and the introduction of new crops. Then corn and sorghum were brought in. They have many varieties of alfalfa. They say that the Grimm variety of alfalfa came from here.

After the Revolution the land area was extended to 1,500 hectares. The area of study was also extended. They now have laboratories for soil science, agro-chemistry, fodder crops, and so on. Since 1956 the station has become a very complex research station with about 10 sections:

Agronomy

Fodder crops

Meadows

Seed selection and breeding

Agro-chemistry and soil science

Animal husbandry

Mechanization

Horticulture

Agricultural economics, and organization of collective farms.

They have a large experimental farm of 5,000 hectares. They have 1,500 cattle and 200 sows with an annual pig production of 5,000.

We go out into the field to see experiments on the protection of slopes from erosion. We see some stripcropping on the slopes to one of the ravines. (K-2545) Fortunately, as I see it, the erosion problem is not serious except on these ravines and escarpment slopes.

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their use K-2545. July 29, 1958. Near Poltava. Poltava Provincial
Agricultural Experimental Station. Stripcropping
on side of old ravine. (Probably degraded Chernozem).

The K-25#5. July 29, 1958. Near Poltava. Poltava Provincial
Agricultural Experimental Station. Stripropping
1,500 cattle and on side of old ravine. (Probably degraded Chernozem).

I see some rather poorly designed terraces on slopes that are all in grain. I take a photograph of the stripcropping with corn fodder and permanent meadow, and with a forest belt on the upper rim. (K-2646) Strips are straight and thus only approximately on the contour. They say they can use machines on slopes below about 40 percent.

Here they explain that they have a section on mass experiments and for collective farm organization that studies the application of both mineral and organic fertilizers and the use of azotobacter and phospho-bacterin.

They show me a detailed soil map of a collective farm on a scale of 1:10,000. I am told that investigations were made at a scale of 1:25,000. They also have a farm plan map at 1:25,000. On a third map the local soil types are grouped in accordance with the seriousness of sheet erosion and other interpretations. Needs for erosion control are shown on a separate map. These maps are accompanied by a 36-page typed report with descriptions of the soils and recommendations for their use.

They tell me that they are now making soil maps of all collective farms at scales between 1:5,000 and 1:25,000. They say that the work will be completed in three years by the 40 institutions in the whole of the Republic. The cost of the mapping is said to be 2 rubles per hectare, which suggests that the work is not very detailed.

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Although this work is undoubtedly very helpful, it could be considerably better. I have a low opinion of the so-called erosion research.

Here on a permanent grass plot, (K-2646) I look at what I should call a Degraded Chernozem or Degraded Brunizem, locally called a dark Gray-Forest soil, slightly washed. The soil is from loess on a 20 percent slope of an old ravine side. It is said to have been plowed and cropped but has been left in grass for a long time.

A _p	0 - 6"	Dark brown (10YR 3/3) silty clay loam. Mixed moderate very fine subangular blocky and medium granular; slightly firm; clear boundary.
A ₂	6 - 13"	Dark yellowish-brown (10YR 3/4) silt loam. Very weakly prismatic; slightly platy; friable.
B ₂₁	13 - 21"	Silty clay loam with dark brown (10YR 6/3) base color and light grayish-brown (10YR 6/2) coats on weak prismatic peds that are friable to medium subangular blocky. Some faint white coatings. Gradual lower boundary.
B ₂₂	21 - 32"	Very dark brown (10YR 2/2) silty clay. Faintly prismatic that easily falls into medium to coarse angular blocky. Moderately firm. Some uneven grayish coats but faint if any clay skins; gradual boundary.
B ₂₃	32 - 40"+4 —	Grayish-brown (10YR 4/2) silty clay. Moderate prismatic that falls into coarse angular blocky that is moderately friable. Some gray coats and some clay skins of very dark grayish-brown (10YR 3/2).
B ₃	40 - 55+	Brown (7.5YR 4/4) silty clay loam with light gray (7.5YR 7/2) silt coats. Moderate, medium to coarse, prismatic that falls into firm angular and sub-angular, moderate to coarse, blocky. About 30 percent of ped faces have clay skins of dark grayish-brown

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Unhappily, the pit ends in the lower E_2 . No doubt the E is loose. One is surprised to see such a well-developed profile on a 20 per cent slope. The slope has a slight ridge and the profile is low on the lower part of this slight ridge.

A sample was taken at the surface: $4'' \times 4'' \times 4''$.

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1. Perennial grasses and legumes (mostly alfalfa)

2. Perennial grasses and legumes

3. Winter wheat



K-2646. July 29, 1958. Near Poltava. Poltava Provincial Agricultural Experimental Station. Stripcropping; a shelterbelt marks upper slope.

K-2646. July 29, 1958. Near Poltava. Poltava Provincial
Agricultural Experimental Station. Striptopina;
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K-2646

Unhappily, the pit ends in the lower B₃. No doubt the C is loess. One is surprised to see such a well-developed profile on a 20 percent slope. The slope has a slight bulge and the profile is just on the lower part of this slight bulge.

A sample was taken at the surface: 4" x 4" x 4".

This profile of Degraded Chernozem indicates a deep natural soil so I am sure that there has been very little accelerated erosion here. In the Middlewest of the United States the profile would be very much shallower in such a situation. This checks with the statement of our guides that they get few intensive rains of which we have so many in the United States.

I look briefly at their crop rotations in a nearly level area on what they call a dark Gray-Forest soil that I should call a Degraded Chernozem. They say their best spacing for corn (K2647) is about 70 x 70 cm. Much of it is harvested for silage in the dough or milk stage. It should be added that nearly all corn is planted with the checkrow system, widely used in the United States ^WWhen I was a boy. With better machines for cultivation and experience I should think they would drop this practice.

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K-2647. July 29, 1958. Near Poltava. Poltava Provincial Agricultural Experimental Station. Corn, about 75 bushels per acre. L. to R. Bulik, Melnikov, and Khereprest.

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4. Corn or sugarbeets
5. A spring crop: barley, oats, buckwheat, or millet
6. Corn for harvest at dough or milk stage
7. Winter wheat or rye
8. Corn (for grain) or sugarbeets
9. Spring cereal
10. Winter wheat

On the basis of their experiments they think that one year in 9 or 10 in grass is enough on collective farms. This may be true for nearly level land, but I should hardly think so for the sloping land. Yet the corn for grain here looks good. They claim 70 bushels per acre on a 5-year average. While taking pictures here Mr. Khereprest tells us that he will go with us during the remainder of our stay in the Ukraine. He seems like quite a good agriculturist.

We then go by a Memorial of Glory commemorating the victory over the Swedish King, Charles XII by Peter the Great in 1709. The present statue was built in 1809. The site is in a nice park with good formal gardens.

We return to the hotel, pack and go to the restaurant. As usual, the meal is slow and we don't get to leave until 3:20 p.m.

About 32 kilometers southeast of Poltava, I look at a Chernozem said to be transitional between thick and ordinary Chernozem. The soil is formed from loess on the third terrace above the Dnepr River. The plain is very gently undulating.

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- A_{1p} 0 - 12" Black silty clay loam with fine granular structure; many fine roots; friable. In upper part, pH is 6.4; in lower part 6.9. Gradual boundary.
- A₁₂ 12 - 22" Black to very dark gray (10YR 2/1 to 3/1) silty clay loam with mixed medium granular, fine angular blocky, and fine subangular blocky. The pH is 6.9. Friable; gradual boundary.
- A₃₁ 22 - 35" Very dark grayish-brown (10YR 3/2) silty clay loam. Fine rounded blocky to very coarse granular with slight vertical breakage of whole mass. Many worm holes and casts; friable; gradual boundary.
- A₃₂ 35 - 38 $\pm$ 4 (Transitional). Dark grayish-brown (10YR 4/2) silty clay loam. Many krotovinas.
- B₂ or 38 - 54" +
C² Brown (10YR 5/3) silty clay loam. Weak, fine subangular blocky to massive in place but digs out in weak irregular blocky that is easily friable (pH 7.1) a/

This does not appear to be a very old soil. But from what I have learned, I gather that all chernozemic soils in the Soviet Union have less evidence of a clay accumulation in B position than do those in the United States that are still called zonal soils.

a/ pH determinations by field meter.

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July 29, 1958. East of Poltava. Cline and Kellogg examining soil profile in Chernozem. Allaway making a pH measurement. (Photo by Bulik).

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K-2648. July 29, 1958. 32 km. southeast of Poltava.
Shelterbelt on Chernozem: Four rows of trees,
mostly maples, oaks, elms, and locust, with two
shrub rows.



K-2546. July 29, 1958. 32 km. east of Poltava.
End of young shelterbelt on Chernozem.
Seven rows: locust, oak, ash, maple,
and others.

2648

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End of young shelterbelt on Chernozem.
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and others.

The profile is examined in a field from which a cereal grain has been harvested and alfalfa seeded. Nearby I see corn used as a nurse crop for alfalfa. (K-2648) This field is surrounded with well-grown, but young shelterbelts. There are 4 rows of trees on some of them with maples, elm, oak, and locust plus outside shrub rows. At another margin there are 7 rows of trees including locust, yellow acacia, oak, ash, and maple. (K-2546) Some pears and wild apples are included.

We leave at 4:55 p.m., along the road to Kharkov. Mr. Taran will leave us at the oblast boundary.

At 5:25 p.m. we leave the Poltavskaya Oblast and enter the Kharkovskaya Oblast. The soils are mostly Chernozem with some patches of forest on the distant slopes. I see corn, wheat (most fields are already harvested), sunflowers, fallow, millet, and sugarbeets. The crops look good, but those in the family plots are better. I see many straw stacks in the fields. There are relatively few shelterbelts, although one is rarely out of sight of some.

Gully control is mainly a matter of protective plantings of grasses and trees. Structures are needed only in extreme situations; but I see a few bad gullies along the streambanks that lack needed structures.

We pass a nice young apple orchard, underplanted with buckwheat, on sloping Chernozem. The houses of collective farmers along here seem a bit better than those west of Poltava. Again I see gullies on some strong slopes needing diversion terraces.

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We pass a large state farm with a big poultry plant in addition to the usual crops.

Along the next ravine I see forest and shrub plantings in strips for erosion control.

As we approach Kharkov there are many orchards on rolling Chernozem and some fish ponds. I see a few large gullies that have been stabilized by protective grass. My guide speaks of "war erosion" in areas that were badly shelled and dug up for trenches.

We pass a special station for agricultural aircraft, hired by collectives for spraying orchards, spreading fertilizers, etc. It is a pity that the country roads are so wet that we have to go around by way of Kharkov.

Yields here seem good, perhaps 75 percent of those of the United States on similar soils. Actually, I have no satisfactory basis for comparison. But obviously labor income on farms is low. These farms have far too much labor and here there is a curious mixture of the most modern methods and of "made work" in order to give people some labor-day units. The hand cutting of green fodder and the hauling of it in little horse-drawn carts are examples. It is the old story of getting more factories for making consumer goods to use the excess labor on farms.

At 6:30 we reach the suburbs of Kharkov and turn left for the main road to Dnepropetrovsk.

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I see orchards, mainly apples, but with some pears and plums, on sloping Degraded or oromorphic Chernozems. In these suburbs people have small fruit and vegetable gardens. We turn southeast on the main road at 6:36. Almost immediately I see two more old gullies, not fully stabilized and needing engineering structures.

We are soon out of the fruit area and see meadows, corn, wheat, and new fallow. There are some clumps of natural trees from the original spots of forest and a few shelterbelts. Later we pass through a natural forest. Most of the trees are oaks about 6 - 12 inches dbh. I pass some more of these oak forests.

About 70 kilometers south of Kharkov I note sugarbeets, recent fallow, wheat being harvested, millet, corn, sunflowers, and some small orchards. There are some more strong slopes with bad stringer gullies that need attention. The wonder is that erosion is not worse. Part of the road along here has such high hedges that I can scarcely see the crops. We pass through Krasnograd at 7:43 p.m. The side roads appear to be impassable. As we go on south we see small clumps of naturally growing trees and more windbreaks, especially along the road for snow control but also along the field boundaries.

I ask my guide why the crops are so much better in the individual plots than elsewhere on the farm. He tells me that this is because the farm family have all the manure from their own cow, pig, and poultry! Obviously, it is mainly a matter of incentive.

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As we reach the boundary of the Dnepropetrovskaya Oblast we are met by a delegation from that oblast office. It is now 8:20 p.m., and we have 90 kilometers to go. So we shall be late to bed again. After we pass the Orel River it is too dark to see.

We are taken to the Ukrainia Hotel. All of us are very tired. Then again a late supper. This seems to be a nice hotel, but I have a front room on a noisy street. To bed at midnight.

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July 30

I am up at 7 a.m. and go out for a walk. It is warm and sunny, but hazy. The stores do not have any first-class goods. Glass, hats, jewelry, and the like are rather poor. Radios are priced at from 300 to 900 rubles, bicycles at about 600 to 700 rubles, moderately small vacuum cleaners at 400 to 450 rubles, etc. As usual, the book stores have mainly scientific and technical books with many windows for chemistry, metallurgy, agriculture, and so on. One show window is for books on Lenin and another for all literature. I notice here that there are fairly long lines at each of the food stores.

In contrast to 1945, one now sees many fat people, especially women past middle age. Many of the people appear to me to be tired, not hungry or otherwise physically distressed, just plain tired.

Here in the USSR the large public buildings of all sorts seem to take the place of the old cathedrals as an escape from poor houses and apartments.

We have breakfast at 8 and are in the cars at 9 for a visit to farms south of the town and west of the river. This town does not impress me as being as clean and gay as Kiev. There is more industry. Near the city limits there is considerable unused and poorly kept land (probably not being held by speculators!) I see shelterbelts along the highway and crops as follows: corn, fallow, wheat, fallow, hay, corn, fruit, and sunflowers.

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On slopes of 20 percent there are deep gullies but no attempt at control. The soils are dark brown and are locally called leached Chernozem.

I am told that when a city wants to expand over the land of a collective farm, the farmers must agree to it! If a state farm is nearby the collective farm is given land from the state farm. But if no land is available, the matter is discussed. Usually the collective agrees, but they get no compensation. (I just cannot believe it is this simple and straight forward.) We drive on. There is more cereal stubble being plowed and more corn. Most of the dark soil is undulating but near the streams it is a medium brown rather than black, possibly from erosion. As we go along I note fallow, sunflowers, corn, wheat, orchards, cereals (mostly winter wheat), fallow, meadow-pasture, and sunflowers. One sees people grazing a few cows along the road. This may be made work or it may be individual family cows herded by grandmother, often accompanied by the children.

We turn right a bit on the main road to Nikopol. Here we have huge fields of sunflowers, fallow, corn, fallow after cereals, and wheat. I notice some burning of heavy wheat stubble in advance of plowing. Then again corn, sunflowers, weedy meadow-pasture with dairy cows, corn, meadow-pasture with dairy cows, fallow, sunflowers, a seed crop of sudan grass or millet, sunflowers, corn, fallow, and small grain.

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The Chernozem soil here is a bit on the dry side. I pass corn, fallow, corn, and new fallow. Now workers in the field are pulling little piles of straw into stacks. I am told that wheat here runs about 3.5 tons per hectare. Again I see fallow and corn. Most of this corn will run from about 35 to 45 bushels per acre. Then we have sunflowers, wheat, fallow, wheat, sunflowers, fallow, wheat, corn, grass seed, wheat, corn, fallow, corn, fallow, and wheat.

Most of the villages seemed to be at considerable distance from the road. I see some windbreaks that are rather thin and narrow. Here, too, most farm homes are small and rectangular and have white-washed walls and thatched roofs. The landscape suggests increasing dryness as if tending toward the Reddish Chestnuts. Generally, the soil is more sloping. I see some man-made ponds within the villages. Here the individual plots have much corn and sunflowers.

Going back to the crops we have fallow, corn, a mulberry planting, corn, fallow, wheat, meadow, fallow, weedy meadow, mulberries as shrubs, corn, grazing cattle on corn, fallow, corn, sunflowers, wheat, meadow-pasture with dairy cattle, wheat, sunflowers, corn, and fallow.

Here again I see many of these old watching hills some 12 to 15 feet high and roughly 100 feet long and 60 feet wide. We make a sharp turn toward the river. I see some grapes, cabbage, cucumbers, pasture with dairy cattle, orchards, vineyards, corn, a young orchard, and some cereal, all without irrigation except for the cucumbers so far as I can see.

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We cross a small ravine with gullied slopes partially stabilized by grass. We pass a small mine.

At 10:55 we come to the Orzhonikidze Collective Farm. I meet Mr. Gordienko, the chairman. Here, too, is a blaring loud speaker at the entrance to the office. Besides the headquarters there are three other villages.

We go into the chairman's office and he speaks to us. The farm is now organized into 5 fields and tractor brigades. At first only 50 farmers were grouped together in this collective. He says the combination was obviously beneficial. They are equipped with machinery. Now there are 560 families on 7,000 hectares. I note that the rainfall here is 350 millimeters. The roofs of some of the houses are thatch, but are rapidly being changed to metal. He tells us he now has the following machines:

28 tractors

29 trucks

1 car

24 combine harvesters

62 engines and motors

All the farm is electrified and mechanized, including the livestock enterprise.

He tells us that before the Revolution grain yields were about 0.5 ton per hectare; now they are 2.5 tons per hectare. Corn for grain yields 4 tons per hectare. Winter wheat is the main grain crop,

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2,500 hectares, not irrigated. The average yield is 2.2 tons per hectare. They use superphosphate, potassium, and some local by-products. They have 300 hectares of irrigated orchard newly planted, besides the old orchards. The livestock includes 700 milk cows, 2,000 pigs, and 13,000 chickens and other poultry. They grow some vegetables. He tells me that they get 5 million rubles from the orchards and a total income of 12 million. He had 650 workers plus young people who work during the school vacation. He has enough labor; but then he admits he could get along with 500. (Of course he doesn't need this many.) All the buildings were destroyed by the Germans and the present ones were constructed after the war.

The agronomist shows a soil map made this year by the Institute in Dnepropetrovsk at a scale of 1:25,000. The map shows 9 units in all including ordinary Chernozem, slightly eroded Chernozem, meadow Chernozem, strongly eroded Chernozem, and local Alluvial soils.

They tell me that they have a 12-year crop rotation about as follows:

1. Fallow
2. Winter wheat
3. Corn for grain
4. Corn for silage
5. Winter wheat
6. Sunflowers
7. Fallow
8. Winter wheat
9. Winter wheat

2,500 hectares, not irrigated. The average yield is 2.2 tons per hectare. They use superphosphate, potassium, and some local by-products. They have 300 hectares of irrigated orchard newly planted, besides the old orchards. The livestock includes 700 milk cows, 2,000 pigs, and 13,000 chickens and other poultry. They grow some vegetables. He tells me that they get 5 million rubles from the orchards and a total income of 12 million. He had 650 workers plus young people who work during the school vacation. He has enough labor; but then he admits he could get along with 500. (Of course he doesn't need this many.) All the buildings were destroyed by the Germans and the present ones were constructed after the war. The agronomist shows a soil map made this year by the Institute in Dnepropetrovsk at a scale of 1:25,000. The map shows 9 units in all including ordinary Chernozem, slightly eroded Chernozem, meadow Chernozem, strongly eroded Chernozem, and local Alluvial soils. They tell me that they have a 12-year crop rotation about as

follows:

1. Fallow
2. Winter wheat
3. Corn for grain
4. Corn for silage
5. Winter wheat
6. Sunflowers
7. Fallow
8. Winter wheat
9. Winter wheat

10. Row crop, corn or melons
11. Spring barley or oats
12. Annual grass, especially sudan

They also have a special rotation for fodder crops including 600 hectares for roots (mangel-wurzels) for cattle. He says they have two of these 12-year rotations yet I doubt very much that they follow them closely even though they may be in the farm plan. The fields of the farm are nearly the same size.

The fruits are graded and packed on the farm and delivered to the towns nearby. They also have vineyards and forest strips for shelter and for erosion control.

He says that 13 members graduated from an agricultural institute. He has graduate officers for field crops, for horticulture, and for animal husbandry.

We take a look at the carpenter shop which has only moderately good circular power saws and other power equipment. He says that previously they had one machine and tractor station for 6 farms but three of the farms were combined into this one. He takes us to a new grain storage structure that looks very good to me. I see several new houses that are very nice, the best I have seen on a collective farm. (K-2649) Many of the others are not very good, but they claim to have a plan to rebuild all of them.

We go out into a corn field. They expect 3 tons to the hectare and may make it. I notice that the corn is planted in check rows but still has not been cross cultivated. The corn is planted in early May and harvested in the middle of September. Some is now being harvested for silage.

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Sunflowers are from waist high to knee high and are yielding 1.8 to 2.2 tons per hectare with 25 to 30 percent oil. They sell the seeds at 150 rubles per quintar. They use a Soviet combine harvester that threshes out the seed. Some new varieties are test have 50 to 54 percent oil and there is a promising new development in sunflower breeding.



K-2649. July 30, 1958. Dnepropetrovsk. New housing on Orzhonikidze Collective Farm.

a narrow swampy area that is being reclaimed. The drainage water is pumped from the ditches into the lake back of the dam. The well will be used for irrigated vegetables.

The orchard on a moderate slope is well irrigated. They have a plastic circular dam that stores a basin around every tree about 6 to 8 feet across. (B-2649) It also has irrigated apples. We are taken into a large grading and pecking shed that stores 1,500 tons of fruit, mainly apples and pears, from 120 hectares. Other land is newly planted in orchard. There are some trees in the old orchard caused by war damage.

K-2649. July 30, 1958. Dnepropetrovsk. New housing on
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Sunflowers are from waist high to head high and they expect 1.8 to 2.0 tons per hectare with 28 to 30 percent oil. They sell the seeds at 150 rubles per centner. They use a special combine harvester that threshes out the seed. Some new varieties under test have 50 to 54 percent oil and there is a promising one just developed and under test that runs up to 73 percent oil. Cut early, sunflowers make good silage. The stalks of mature sunflowers are burned and the ash used as a potassium fertilizer. When they sell the sunflower seeds to the government they are given back the cake free for animal feed.

Clearly this farm has plowed much of its income back into the farm. I get the impression that these people are anxious for peace and a chance now to enjoy some of the advantages from their hard work and their savings.

Here, too, I see some of the old watching hills. Some of them have wooden towers for triangulation stations some 25 feet high.

We go to the orchard and vegetable area. The farm is cut by a narrow swampy area that is being reclaimed. The drainage water is pumped from the ditches into the lake back of the dam. The soil will be used for irrigated vegetables.

The orchard on a moderate side slope is sodded and irrigated. They have a little circular bund that makes a basin around every tree about 6 to 8 feet across. (K-2547) I also see irrigated grapes. We are taken into a large grading and packing shed that cares for 1,500 tons of fruit, mainly apples and pears, from 120 hectares. Other land is newly planted to orchard. There are many gaps in the old orchard caused by war destruction from a battle here.

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These are now filled with young trees. All of the peach trees were destroyed by the Germans and they plan to restore them soon.

The soil under the orchards is sowed. They use phosphorus, nitrogen, and potassium for fertilizers. An application of glass soil is put on in the spring with the irrigation water.

I am told that they have planted apples and plums. I saw a narrow road through the orchard.

The orchard is stored till now. "champagne." I He asks for my autumn!

The water is



the control of the orchard. In places I believe the yield has increased. K-2547. July 30, 1958. Near Dnepropetrovsk. On Orzhonikidze Collective Farm. Sodded, irrigated orchard with cultivation around trees. (Chernozem).

English name: orchard. In the orchard I saw many

excellent apples and other fruits. The apples are delivered to the government and they get 2.5 rubles per kilogram for the small ones

and 1.5 rubles per kilogram for the small ones. The apples are

stored and sold out of season, they get 3 rubles per kilogram.

that some of the good trees I am looking at are very old

and I am believe it. There are several trees which are

K-25#7. July 30, 1958. Near Dnepropetrovsk.
On Orzhonikidze Collective Farm. Sodded,
irrigated orchard with cultivation around
trees. (Chernozem).

These are now filled with younger trees. All of the peach trees were destroyed by the Germans and they plan to restore them soon.

The sod under the orchards is mowed. They use phosphorus, nitrogen, and potassium for fertilizers. An application of night soil is put on in the spring with the irrigation water.

I am told that they have 29 varieties of apples, pears, walnuts, and plums. I notice at least one separation of the orchard by a narrow road lined with very tall poplar trees.

The chairman gives me some apples harvested last autumn and stored till now. These are a moderate-sized, yellow apple called "champagne." I tell him that it is the best apple I have ever tasted. He asks for my name and address so he may send me a box of them next autumn!

The water distributing system is a bit crude and I doubt that the control is adequate. In places I believe the yield could be increased substantially. But in other places the crop is very good. Each plot is about 5 hectares and the most of them are bordered by English walnuts. As we go on through the orchard I see some excellent apple and pear trees. The apples are delivered to the government and they get 2.5 rubles per kilogram for the normal ones and 1.5 rubles per kilogram for the small ones. For the good apples stored and sold out of season, they get 5 rubles per kilogram. I am told that some of the good trees I am looking at produce 500 kilograms of apples and I can believe it. These are sprayed 5 or 6 times annually.

These are now filled with younger trees. All of the peach trees were destroyed by the Germans and they plan to restore them soon.

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The orchard is not perfect, but on the whole it is a very good one.

Then we go to lunch at tables set up in the orchard. Of course, there are many fine speeches but all in all it is very pleasant. This is the first of these kinds of banquets that I have really enjoyed.

After lunch we are driven to a good-sized boat in order to cross the Kakhov water reservoir. We leave at 3:30 in order to see a state farm where they plan to irrigate a large area from this new "freshwater sea," really a lake. They told me that 2,900,000 hectares were already irrigated in this general region. That seems like a pretty big figure. The Chief of the Harbor comes with us, which is quite an honor. He is ^a kind of Russian Wallace Beery!! He is a good singer and gets nearly everyone else singing.

As we arrive at the state farm hundreds of people are there to see us. We go through the crowd into a little bus and go over one of the roughest cobble stone roads I have ever been on. I see vegetables, corn, potatoes, hybrid corn seed and sugarbeets.

We are now on the Dneprovski State Farm which was organized in 1926. It has 18,000 hectares with 6,000 already irrigated. The main income comes from milk and 1,400 hectares of vegetables and amounts to 7,200,000 rubles. They produce early vegetables and vegetable seeds.

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We are taken to a field of a chernozemic Alluvial soil near the river that is being leveled for irrigation. My guide insists that this is an old terrace and the soil is an ordinary Chernozem. (Privately, I think it is a fairly young terrace.)

They are making cuts here of 10 to 15 cm. up to a maximum of 25. I think this demonstration is being put on for us. (K-2548 and 49) They are using caterpillar tractors with large dump scrapers and a leveling machine that is a bit too small for the best results.

We drive on and I see some Red Steppe dual-purpose cattle. For the first time I see a shelterbelt spoiled by grazing. (Added later: This is the only one I saw. We have a great many so spoiled in the Great Plains.) We pass a young vineyard and they take us to the pumping station of this irrigated area. They can furnish water to about 10,590 hectares. Our lecturer gives us a lot of discussion about the number of drop siphons and all the rest. I don't see anything especially remarkable. He says they can lift 5,200 liters per second.

We go to a field being irrigated by a very strong spray pump operated by power take-off from a large caterpillar tractor. The field has eggplant and tomatoes.

We are then taken to an opening within an old wide shelterbelt for supper. This is another big one with lots to eat and drink and the usual toasts. I try to say something different at each of these,

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K-2548. July 30, 1958. Near Dnepropetrovsk.
Dneprovski State Farm. Land leveling.



K-2549. Near Dnepropetrovsk. Dneprovski State Farm.
(another view).

K-2548. July 30, 1958. Near Dnepropetrovsk.
Dneprovski State Farm. Land leveling.

K-2549. Near Dnepropetrovsk. Dneprovski State Farm.
(another view).

but I fear that I shall run out of soap before we get back to Moscow.

Then we get into the shaky bus and go back over this terrible cobble-stone road to the lake and onto the boat at 8:45.

The crossing is nice and we reach Nikopol at 9:30. Now the long, long ride back to the hotel in the dark until 11:40 p.m. This has been an interesting day but a very tiring one.

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July 31

My hotel is too noisy to sleep after 6 a.m. when the street-cars begin their screeching. I pack some of my things. No tea is served in the rooms! It is already sunny and warm in the streets.

Until now I hadn't realized how bad the road system is in this country. Even the main black-top roads are not real good; and the earth roads are very bad. Most of the roads to the farms are neither graded nor drained. They are very dusty in dry weather and very muddy in wet weather. As the dust blows out and the mud spatters, they gradually sink into the landscape, which makes matters worse.

After breakfast our local hosts come at 10:05 and they say that both the farmers' market and the art museum are closed. At 10:15 we leave for the corn-breeding institute.

In this city, as elsewhere, the main effort, up to now, toward improvement is along the main streets. The back streets and the buildings on them are rather shabby.

We come to the All-Union Scientific Research Institute on Corn. This is under the Lenin Academy of Agricultural Sciences in Moscow.

Our hosts point out that the large expansion of corn growing in the USSR for grain and fodder requires a large expansion of research for seed selection, mechanization, agro-technical methods, pest and disease control, economic evaluation, etc.

The Institute was founded in March 1956 on the basis of a Grain Research Institute, started in 1930. The old institute dealt with the problems of the forest-steppe zone. The research of that zonal

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The Institute was founded in March 1956 on the basis of a Grain Research Institute, started in 1930. The old institute dealt with the problems of the forest-steppe zone. The research of that zonal

institute is being continued but the program now considers the whole Soviet Union. The present Institute inherited many experimental stations and now has 15 such stations with a total of 15,000 hectares. They have an experimental farm about 45 km. from Dnepropetrovsk and there are others in the other republics.

The Institute hopes to increase corn production and farm productivity. They are working on organic, mineral, and bacterial fertilizers for corn and other crops. They are trying to reduce labor requirements. They cooperate with collective and state farms for large scale trials involving 60,000 hectares. These trials show that if corn producers were to have enough machines and labor they could produce 100 hectares of corn with 19 or 20 man-hours. (Added later: This must be for one hectare) Actually a tractor driver and his assistant can cultivate 200 hectares of corn for either grain or silage. So they select machines best suited for 200 hectares. They call this group a machine aggregate, complex, or set. In 1958 in this Oblast they had 1,116 such machine complexes for growing corn on 200 hectares.

The corn is planted by the check-row method. Much of the labor cost was for thinning. Their present machines control the rate of sowing and the kernels per hill. They use a tractor-mounted cultivator and a special combine harvester or two-row picker (KU-2 and KU-2A). The machine picks the ears and chops the stover either for silage or to plow down. The picked ears are collected by dump trucks or tractor-drawn tip wagons.

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This complex brigade for two laborers has the following:

1 wheeled tractor

1 check-row planter, usually the trail type but some
are tractor mounted

1 cultivator

1 or 2 corn pickers

1 silage-making harvester for 4 rows

With this equipment two men could grow corn on 100 or 150 hectares for either grain or silage. To stimulate work these brigades are given bonuses.

(Obviously I'm not getting an entirely consistent story.)

Planting and harrowing are done separately but not by these two men. Plowing is done by crawler tractors. Most use five-bottom plows for a strip 1.75 meters wide but some use ten-bottom plows. Normally they plow in the fall. In the spring they harrow once and give two cultivations before planting, although in wet springs they harrow 2 or 3 times. A spike-tooth harrow follows the cultivators the last time after the seedbed is prepared before planting. After the corn is up they cultivate twice along the rows and twice across them. Occasionally they use the spike-toothed harrow just as the corn comes out of the ground. They are trying to reduce cultivation (which they certainly could do with weed killers.) Sometimes they use a disk to cut the stubble after harvest and before plowing.

Now I am told that it takes 20 man-hours per hectare, including the first operation but not corn shelling. This was their best experiment, the poorest took 34 hours. Experiments on collective farms showed 47 man-hours per hectare, including the shelling.

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(I'm convinced that these are highly theoretical and that there is no such labor efficiency on the actual farms.)

For grain I'm told that at the station one man-hour produces 100 kilograms of corn. Thus, they say, by using the improved methods the output per man-hour can be increased by 5 or 6 times over recently current practices. These methods also are said to reduce the number of tractor hours by about 20 percent. One farm laborer can handle 100 hectares except for harvesting. (These are certainly theoretical figures and do not include periods of bad weather, breakdowns, and all the rest.)

They are also studying ways of controlling diseases and weeds and of how to dry and store seed corn. Crops used in the rotations are also under study, including winter wheat, spring cereals, oil bearing crops, soybeans, lentils, other pulses, fodder crops, sorghum, sudan grass, millet, etc.

The pedology laboratory here studies ways to improve Solonchak and Solonetz to make them suitable for these crops.

I ask whether they have methods for mono-culture of corn. They reply that they are now interested and expect to start research next year.

They usually recommend 30 to 45 kilograms per hectare of nitrogen for corn. On Chernozem they apply the fertilizers a little below and a little to the side of the seeds, which are in hills. Their research includes P, K, N, and the trace nutrients. On Chernozem phosphorus is very important. Even 25 kilograms per hectare gives good results and only 5 kilograms will show response. They like to use granular

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superphosphate. Nitrogen is applied at the same time or later in May or June as a side dressing. But side dressings of nitrogen give no result on Chernozem in dry years.

They use farmyard manure most commonly on winter wheat but some goes on corn.

They claim good results from the use of phospho-bacterin applied to the seeds. They claim that azotobacter is effective in moist years on soils well supplied with phosphorus.

Foliar sprays are not effective here but are further north.

They tell us something about their plans for 1960. They hope to have 28,000,000 hectares of corn in the USSR. In 1957 they had 24,000,000 hectares.

Here in this Oblast 536,000 hectares are in corn - of this 50,000 for green fodder, 216,000 for grain, and 280,000 for silage. (The squirrels must have brought in 10,000 hectares.)

On an average for the USSR, their targets for 1960 are 2.5 tons of grain per hectare and 30 tons of silage per hectare.

We make short visits to the laboratories of plant pathology and agro-chemistry, where they are studying the usual things. Some of their experiments were begun in 1910. Previously they had thought that only phosphorus was needed for corn on Chernozem, but as the phosphorus is built up they note first nitrogen deficiency and then potassium deficiency. In fact, the long time use of phosphorus occasionally gave depressed results. I am well impressed with their agro-chemical program.

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We hurry back to the hotel, pack, and leave for the airport at 1:15 p.m. On the way we pass two watching hills some 20 feet high.

We reach the airport at 1:30 and wait and wait. Our plane was scheduled as a special flight. A storm at Kiev has interrupted the radio so, as of 3:25 p.m., I don't know when, as, or if we shall leave for Rostov.

I have some long talks with our hosts (especially V. P. Osadchin, assistant director of the agricultural administration of the local Oblast) about this and that. We talk quite a bit about overemployment on farms and the plans for using the periods of unemployment during the winter. I am told that a few oblasts in the USSR have significant cottage industries but certainly not many.

Finally the plane comes at 5:15 and the wheels are up for Rostov at 5:25.

Near the river the sides of the natural ravines are cut by new accelerated gullies. The soil appears to be Chernozem. The crops are mainly cereals, meadow, fallow, and corn. (It is too hazy to see clearly). There are a few shelterbelts.

Most villages have their houses in line along the road, sometimes in single rows and sometimes double.

We continue on and at 5:45 there is still almost no wasteland. As elsewhere, the private plots stand out clearly.

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These Ukrainian people are certainly friendly and I feel genuinely so. It is truly remarkable how they have rebuilt their burned out cities and villages; and how they have recovered their spirit after the horrible German occupation and terror.

Further on I see an escarpment with bad gullies in the fields but these are fully controlled where there are private plots on the escarpment, so the peasants know how to do it. Yet aside from these narrow strips of moderately gullied land on the terrace escarpments there is exceedingly little wasteland. I see fallow, corn, wheat, and sunflowers.

We are down at Stalino at 6:12 p.m. and leave at 6:55. At the margin of the city I see small plots or allotments used by apartment dwellers for individual fruit and vegetable gardens. In the newest subdivisions, there seem to be many individual houses with such gardens.

Near the river I see some deeply trenched, small water courses with eroding slopes. In places there are many gullies but no check dams or diversions. Unsuccessful attempts are being made to protect these slopes with grass cover and with irregular tree plantings on the cut banks. Simple contouring with strips would protect many of the slopes.

At 7:10 p.m. we are over rolling land of which a little is farmed in the favored places. Here I see the most serious erosion since I have been in the USSR. But in 3 or 4 minutes we are again over cultivated soil.

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About halfway to Rostov from Stalino I see Chernozem with good crops of wheat, corn, sunflowers, orchards, etc. I see a few big deep round grassed holes, which may be old shell holes. Then we pass over more of these small deeply trenched streams with eroding slopes; but they are widely spaced. Then some more of these holes. Near Rostov I see a small airfield with protecting embankments along with considerable unidentified equipment.

We are down in Rostov at 7:30 p.m. and by 8:00 we are in the cars for the city. I am told that the central part of the city was completely destroyed by the Germans. The city has a great "green belt" of trees around it. These include acacia, ash, maple, and others. Within the belt are special tree farms for forestry work.

We arrive at the Don Hotel at 8:45 and discuss our plans with our hosts. We agree on one lecture, one state farm, and one collective farm. Our hosts can see that we are nearly exhausted, and, praise the Lord, there is no banquet.

I go down to dinner with the others. I am so tired and the waiters are so slow that I give it up, take a bath, and go to bed.

(During our stay in Rostov, we have several meetings with our hosts. A reasonably complete list follows:

Southern State Institute for Designing Water Economy:
Yuzhgiprovdokhoz, in Rostov

1. From Yuzhgiprovdokhoz:

1. Director of the Institute - Ovchinnikov, A. A.
2. Vice Chief Engineer - Malinovskii, P. I.
3. Head of Topographical Survey Section - Gorskii, M. M.
4. Head of Soil-Melioration Section - Konovalov, N. M.

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4. Head of Soil-Melioration Section - Kononov, N. M.

5. Chief Engineer of Project - Melodiev, G. S.
6. Chief Engineer of Project - Shtepa, B. G.
7. Head of Technical Section - Loshchilov, M. A.
8. Senior Engineer - Simontovskaya, K. I.

2. Invited Guests:

1. Head of the Oblast Administration of Water Economy -
Rybchevskii, V. S.
2. Director of Yuzniggima (Southern Scientific-Research Institute
for Hydrotechnique and Melioration) - Litvintsev
3. Vice Head of Oblast Administration of Agriculture - Tidzhiev
4. Head of Oblast Section of Land Utilization - Fokin
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3. Vice Head of Oblast Administration of Agriculture - Tishiev
4. Head of Oblast Section of Land Utilization - Tokin
5. Head of Soils for Oblast Administration of Land Utilization - Fedyshev.)

August 1

This bright sunny morning promises a hot day. I take a short walk. Here, too, the pigeons are feeding along the street. Some good Party member must have been to Venice! The pavements in the side streets are pretty bad. We go to breakfast at 7 a.m.

The cars come at 8:02 and take us to the Southern State Institute for Designing Water Economy. Here they have a beautiful table all set with flowers, fruit, meat, wine, and cognac. The conference is attended by the Director of the Institute, the Chief of Water Economy for the Oblast, the Director of the Southern Institute on Hydro-technique, the Chief of Agricultural Administration in the Oblast, the Chief of the Section on Agricultural Land Utilization, the Chief for Soil Investigations, and others.

First of all, we are given a general statement about the Rostovskaya Oblast. The total area is said to be 10,500,000 hectares. There are 180 state farms and 383 collective farms. They vary in size from 5,000 to 50,000 hectares with an average of 13,000. Compared to other places, this is a high proportion of state farms. The rainfall is said to be about 500 millimeters in the western part and 300 to 400 in the eastern part. Therefore irrigation gets considerable emphasis.

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There is said to be about 11 main kinds of soil in 5 groups as follows:

1. Ordinary chernozem with A horizons of 90 cm. (The area of this is 2 percent.
2. Northern Azov Chernozem with A horizons of 90 cm. (10 percent)
3. Southern Chernozem (36 percent)
4. Dark Chestnut soil (10 percent)

This has spots of Solonetz up to about 5 or 10 percent of the area.

5. Light Chestnut (Brown soil) (10 percent)

This also has spots of Solonetz. Perhaps the 32 percent includes Alluvial soils, Lithosols, Solonchak and Solonetz.

They say that about 87.7 percent of the land is used for agriculture: 57 percent is plowed; 5.7 percent is in natural meadow; 24.4 percent is mainly extensive pasture for sheep where much of the soil is Solonetz; and 0.6 percent is in orchards and vineyards. There is a small acreage for forest.

They point out that the differences in climate and soil give rise to great differences in farm economy. They show us a map with 5 zones:

1. Grain crops and livestock
2. Vegetables, mostly irrigated, near the town
3. Viticulture on irrigated soil
4. Animal husbandry with some grains
5. Sheep grazing (fine-wool sheep)

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Generally their basis for agriculture is grain which accounts for about 65.4 percent of the arable land. This is roughly divided as follows:

Winter wheat	37 percent
Corn for grain	10 percent
Spring wheat	4.3 percent

Sunflowers account for 7.5 percent and there are smaller acreages of castor beans, sanfoin, grasses, mustard, seed flax, alfalfa, and so on.

They expect to expand orchards and vineyards from 83,700 to 250,000 or 300,000 hectares by 1960. Thirty-five state farms are specializing in orchards and vines although there are some on collective farms. But the heavy capital investment is difficult for the collectives.

They have several teams for soil surveys of state and collective farms and to make the interpretations and plans. This is about two-thirds done and they hope to have it completed in 2 years. They are giving increased emphasis to farming by scientific methods based on the soil maps. They have developed improved tillage, rotations, fertilizers and varieties according to the kinds of soil within the several zones. Emphasis is being given to animal fodder crops and to increased irrigation. About 300 specialists take part in making these plans plus the local trained workers on the farms. They now have 150,000 hectares irrigated and most of that has been developed within the last 7 years.

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They say the Don flows at about 300 to 400 cubic meters per second. This peaceful steppe river is high when the snow is melting in the spring. The new Tsimlyansk reservoir holds 24 billion cubic meters. Their dams allow them to have water for navigation, power, irrigation, and commercial fishing. They also have other small reservoirs and about 1,500 ponds and small lakes on farms. These help regulate water flow for irrigation and supply villages with water. The main Don canal flows at 150 cubic meters per second at the start and 80 cubic meters per second at the end. We are given a torrent of statistics on the length of canals, number of pumping stations, and the like. They are also carrying out drainage on the 36,000 hectares of the 123,000 that have been irrigated since 1950 as a result of the construction of the Volga-Don Canal.

Without irrigation they get 1.7 to 1.8 tons of small grain. This year they expect over 2 tons per hectare.

In making plans for the farms, the chairman or manager and the agronomist take full part. The plans are discussed at a meeting with all the specialists. After full discussion and settlement of the issues, managers of both state and collective farms are required to follow these plans.

We are told that this Institute was founded in 1949, partly in connection with the construction of the Don Canal. Near the top of the pool a canal has been constructed between the Don and the Volga just below Stalingrad. Afterwards the Institute took responsibility

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for designing irrigation in all the northern part of the Oblast. Besides two substations they have several expeditionary parties. They have 1,100 people on the staff including design engineers, prospecting engineers, and topographic engineers. There are sections on hydrology, soils, construction, and agro-economics.

We have a long lecture from a large map that includes Stalingrad and Krasnodar about existing canals and planned canals for a large amount of irrigation. In this large area a million hectares are to be irrigated and farms and animals will be supplied with water on 13,000,000 hectares, including irrigation water for small vegetable plots. Ground water is insufficient and much of it is salty.

Then comes eating, drinking, and toasting. With effort I get the group into the cars at 10:10 a.m., and we drive south of Rostov and cross the Don. Here I note that a group of laborers at work on the railway track are about one-third women. The road has many turcks, a few cars, and a few small carts or wagons pulled by donkeys, horses, men, or women. I even see some bundles of marsh grass being hauled along the road on bicycles as we pass along the high grade through a wide area of marshy land. Through the industrial area I see many small individual houses with gardens. Several of the houses are painted blue and have green shutters. We pass a good windbreak of acacia, poplar, and other species.

On the way to the state farm we stop near the distribution canal (K-2550) that is a part of the Azov irrigation system that irrigates 35,000 hectares on 16 state and two collective farms. These have 450 to 7,500 irrigated hectares.

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K-2550. August 1, 1958. Near Rostov. Canal that brings water to Koisug State Farm.



K-2551. August 1, 1958. Near Rostov. Device for measuring water in irrigation canal.

K-2550. August 1, 1958. Near Rostov. Canal that brings water to Kolaug State Farm.

K-2551. August 1, 1958. Near Rostov. Device for measuring water in irrigation canal.

I look at a soil on a nearly level terrace said to be "Caucasian Chernozem." It looks to me like a dark Chestnut or Chestnut-Chernozem intergrade of the United States.

- | | | |
|----------------------------|----------|---|
| A _p | 0 - 6" | Very dark brown (10YR 2/2) silty clay loam. Mostly medium granular with a few friable, medium, subangular blocky peds. |
| A ₁₂ | 6 - 19" | Very dark grayish-brown (10YR 3/2) silty clay loam that digs out in very easily friable clods. Mainly medium granular. Gradual-clear boundary. |
| B ₂₁ | 19 - 33" | Dark brown (10YR 3/3) silty clay. Digs out in very friable subangular peds that fall easily into medium granular. Slight vertical breakage of mass. Slight, weak clay skins. Peds removed show pressure faces but few clay skins. Gradual boundary. |
| B ₂₂ | 33 - 41" | Dark yellowish-brown (10YR 3/4) silty clay. Like above but somewhat coarser structure and more clay skins. Light brownish-gray silt on some ped faces. Fairly friable; plastic; clear wavy boundary. |
| C ₄₁ | 41 - 50+ | Dark grayish-brown (10YR 4/2) silty clay. Friable medium angular blocky. After a little drying clods show a white network that suggests calcium carbonate. Soil moist. |

Here my guides are not quite consistent. Now the general opinion is that in the Soviet scheme this soil is a Western Azov or pre-Caucasian Chernozem. The material is mainly loess, but it may have been reworked a bit by water.

Nearby I look at a nice old shelterbelt. (K-2552) The main tree is acacia, but there are ash and a few others. It has 9 rows about 6 or 7 feet apart and the crowns are 40 to 50 feet high.

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been reworked a bit by water.

Nearby I look at a nice old shelterbelt. (K-2522) The main tree

is acacia, but there are ash and a few others. It has 9 rows about

6 or 7 feet apart and the crowns are 40 to 50 feet high.



K-2552. August 1, 1958. Near Rostov. Shelterbelt on "Western Azov" Chernozem. Acacia with ash and a few others. Nine rows, 6 to 7 feet apart, crowns 40 to 50 feet high.

K-2552. August 1, 1958. Near Rostov. Shelterbelt on
"Western Azov" Chernozem. Acacia with ash and
a few others. Nine rows, 6 to 7 feet apart, crowns 40
to 50 feet high.

We drive along to the Koisug State Farm. We look at some of the irrigated vegetables including tomatoes, onions, carrots, red beets, eggplant, harvested potatoes, sweetcorn, cucumbers, cabbage, and marrow, or something like summer squash. We stop at a brigade headquarters and I am formally presented a bouquet of flowers by the brigade leader, who is a small and energetic woman. She had been given a brief speech to memorize about peace, which everybody wants.

We are taken into a little house for a lecture by Lishin who has been an agronomist on this farm since March, 1958. The farm has 9,870 hectares of which 4,150 are cultivated. All of it is in the old flood plain of the Don River. Some of the uncultivated land is on a wettish first terrace. Some 2,200 hectares are used for hay and 1,820 for pasture. About 2,900 hectares of cultivated land are irrigated and 1,150 are not irrigated. He shows us a soil map at a scale of 1:25,000. This shows 12 kinds of soil on this farm out of a total of 96 in the classification scheme for this local region. Except for the wettish soil they all belong to the general group of pre-Caucasian Chernozem.

The area under vegetables is said to have two crop rotations, one for 8 years and one for 10 years. The vegetable areas here will ultimately be planted to orchards. (It is certainly difficult for the visitor to know when he is being told the actual situation and when he is being told the plan.) The farm now has 500 hectares under vegetables. Next year a part will be under an 8-year rotation

We drive along to the Kotsau State Farm. We look at some of the irrigated vegetables including tomatoes, onions, carrots, red beets, eggplant, harvested potatoes, sweetcorn, cucumbers, cabbage, and marrow, or something like summer squash. We stop at a brigade headquarters and I am formally presented a bouquet of flowers by the brigade leader, who is a small and energetic woman. She had been given a brief speech to memorize about peace, which everybody wants.

We are taken into a little house for a lecture by Nishin who has been an agronomist on this farm since March, 1958. The farm has 9,870 hectares of which 4,150 are cultivated. All of it is in the old flood plain of the Don River. Some of the uncultivated land is on a wetish first terrace. Some 2,200 hectares are used for hay and 1,820 for pasture. About 2,900 hectares of cultivated land are irrigated and 1,150 are not irrigated. He shows us a soil map at a scale of 1:25,000. This shows 12 kinds of soil on this farm out of a total of 96 in the classification scheme for this local region. Except for the wetish soil they all belong to the general group of pre-Caucasian Chernozem.

The area under vegetables is said to have two crop rotations, one for 8 years and one for 10 years. The vegetable areas here will ultimately be planted to orchards. (It is certainly difficult for the visitor to know when he is being told the actual situation and when he is being told the plan.) The farm now has 500 hectares under vegetables. Next year a part will be under an 8-year rotation

and a part under a 10-year rotation. Both rotations are supposed to have two years of grass for seed. I am not sure that I understand him correctly, but I think it seems to go something like this:

1. Perennial grass
2. Perennial grass
3. Potatoes
4. Potatoes
5. Vegetables: cabbage, tomatoes, etc.
6. Vegetables: cabbage, tomatoes, etc.
7. Vegetables: cabbage, tomatoes, etc.
8. Vegetables: cabbage, tomatoes, etc.

Then the other rotation with fodder crops is:

1. Alfalfa and barley
2. Alfalfa for hay
3. Spring wheat
4. Winter wheat
5. Winter wheat
6. Corn, 20 percent for grain and 80 percent for silage
7. Barley or oats
8. Barley or oats
9. Fallow
10. Corn

They have still other, somewhat different rotations for fodder crops that are planted close to the livestock barns.

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They have still other, somewhat different rotations for fodder crops that are planted close to the livestock barns.

The farm has around 370 to 380 families with 520 laborers and 330 additional temporary laborers.

The livestock seems to be as follows:

Cattle	2,100 of which there are 835 milk cows
Hogs	2,560 of which 130 are sows
Poultry	26,000
Sheep	1,980
Beehives	200

On this state farm, as others, workers are paid only in cash. A quota is established for a day of each kind of work. If the worker exceeds his quota he is paid extra. The following example is used:

The worker is supposed to gather 300 kilograms of cucumbers in one 8-hour day and for that he gets 20 rubles. The brigade leader says that 80 to 85 percent of the people in her brigade over fulfil their quotas.

Each family has a garden plot. The ordinary worker has a .15-hectare plot and a specialist has .2 hectares. The family gets water for irrigation free. But this arrangement is only temporary. When all the reclamation scheme is finished, families will pay for their irrigation work.

Fertilizer is used at about .5 ton per hectare of nitrogen and superphosphate along with 10 to 15 tons of farmyard manure. Some crops need more and others less. On cabbage, for example, they use 150 kilograms of ammonium nitrate and about 350 kilograms of superphosphate.

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The worker is supposed to gather 300 kilograms of cucumbers in one 8-hour day and for that he gets 20 rubles. The brigade leader says that 80 to 85 percent of the people in her brigade over fulfill their quotas.

Each family has a garden plot. The ordinary worker has a 15-hectare plot and a specialist has 2 hectares. The family gets water for irrigation free. But this arrangement is only temporary. When all the reclamation scheme is finished, families will pay for their irrigation work.

Fertilizer is used at about .5 ton per hectare of nitrogen and superphosphate along with 10 to 15 tons of farmyard manure. Some crops need more and others less. On cabbage, for example, they use 150 kilograms of ammonium nitrate and about 350 kilograms of superphosphate.

We walk out into the fields. They make furrows for irrigation in the spring and remake them after cultivation. They usually irrigate about 10 times in furrows between alternate rows. They fill the head ditches after each irrigation to permit the use of tractors. It strikes me that the water here is poorly controlled. After questioning them about when they irrigate, it is clear that they simply follow the rule of the "wise farmer."

Each member of the brigade is responsible for a specific area of 1 to 1.25 hectares throughout the season, including the work in the hotbeds. Each one has a quota and a plan which describes the field operations and their costs.

As I look over the vegetables (K-2553), I note that most of the work is done by women. Many of them are barefoot. I ask about the lack of uniformity in the field and am told this is due to hail. If so, it must have come very early.

During the height of the harvest each brigade member has some special temporary help from housewives and students.

Here they seem to use a kind of factory system. Each worker has a worksheet with the planned time and cost of each operation. Each worker can work as many hours as he, rather she, wants to. Of course the work is inspected by the brigade leader. When the leader is satisfied with the work she signs the piece-work sheets. Then I am told that each worker gets 24 working days of vacation with pay; but it is not clear how that pay is calculated, perhaps simply the standard pay, or less if the average has been less.

121

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Each member of the brigade is responsible for a specific area of 1 to 1.25 hectares throughout the season, including the work in the hotbeds. Each one has a quota and a plan which describes the field operations and their costs.

As I look over the vegetables (K-2523), I note that most of the work is done by women. Many of them are barefoot. I ask about the lack of uniformity in the field and am told this is due to hilly. If so, it must have come very early.

During the height of the harvest each brigade member has some special temporary help from housewives and students. Here they seem to use a kind of factory system. Each worker has a worksheet with the planned time and cost of each operation. Each worker can work as many hours as he, rather she, wants to. Of course the work is inspected by the brigade leader. When the leader is satisfied with the work she signs the piece-work sheets. Then I am told that each worker gets 24 working days of vacation with pay; but it is not clear how that pay is calculated, perhaps simply the standard pay, or less if the average has been less.

August 1, 1958. Near Rostov. Irrigated vegetable
area on Krasnaya State Farm.

The carrots here are said to run 35 tons to the hectare. They certainly look good.

On the tomatoes they use a solution fertilizer. This has about 25 to 30 grams of ammonium nitrate and 50 to 60 grams of superphosphate for each 10 liters of water. They make two applications about 25 days apart at the rate of 1,500 liters per hectare, presumably shortly after the plants are set out.

We then go to the Red Orchard State Farm. This one has an area of 1,800 hectares, of which 750 are under orchard. Some 320 hectares of orchard are irrigated. By 1960 they hope to have 1,200 hectares in use with 1,050 in orchard of which about one-half will be apples. The other fruits are pears and cherries. By 1962 they expect to produce some 4,000 tons of these fruits. Recently their income has averaged 1.5 to 2.0 million rubles, net; last year it was 2.4 million. Out of this income 1,350,000 rubles went to the laborers including 180 permanent workers and 500 to 600 temporary laborers during harvest.

The profit from their operations is used for new houses, new machines, land reclamation, and new orchards.

There is said to be some chloride salts in the low places and I can see that they have some problems of drainage.

Here there are tall windbreaks of poplars. As I go over the orchard I notice that a part has rather poor trees. This condition is said to be due to poor drainage resulting from improper controlled irrigation and possibly some excess salt. I look at their canal from which they take water and their system is not very good.

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25 to 30 grams of ammonium nitrate and 20 to 60 grams of superphos-

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which they take water and their system is not very good.

Then I am taken to a young orchard on a higher terrace where it is said that the water table is at 60 meters. (K-2554) The irrigation scheme is designed and they hope to build it next year. Here apple trees planted in 1955 are said to have root systems two meters deep and $3\frac{1}{2}$ meters in diameter. They have been fertilized with phosphorus.

Of course we have to take another lunch here and I sit next to an interesting old soil scientist, German Ivanovich Gruzdev. He is quite an old man and might have been taken for Professor Glinka. I take his picture next to one of the nice shelterbelts, designed primarily against summer winds - acacia, black poplar, ash, and elm. (K-2555) This shelterbelt is 4 years old and is only 15 feet high, Here they are afraid of hot winds from the east and like to design their shelterbelts around rectangular fields 1,000 meters long and 30 meters wide. The belt itself is 5 meters wide. The roads in the old orchard have rows of tall trees along with shrubs on either side for protection against the hot east winds. These are planted in either fall or spring but not in the fall if the soil is dry.

After a light lunch we drive to the Lenin Collective Farm. We leave the irrigated area and go onto a treeless, undulating plain - treeless except for a few distant shelterbelts. The crop is mainly wheat. Here for the first time I see baled straw from a stationary baler. Fairly young windbreaks are 1 to 2 kilometers apart. We detour a place where the road is being repaired. Most of the road workers are women.

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K-2554. August 1, 1958. Near Rostov. Apples planted in 1955 on Red Orchard State Farm. Western Azov Chernozem.



K-2555. August 1, 1958. Near Rostov. Four-year old shelterbelt on Red Orchard State Farm. Has Acacia, black poplar, ash, and elm. Mr. G. I. Gruzdev, local soil scientist.

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and elm. Mr. G. I. Grunzev, local soil scientist.

This Lenin Collective Farm is a "raisemkhoz" -- a kolkhoz (collective farm) that produces seed for collective farms in the rayon. On this farm there are also sunflowers and land in fallow. As on some other farms the agronomist is a young woman, a graduate of an institute.

We stop at the field camp of a tractor brigade attached to a field brigade. (K-2556) The collective was founded in 1930. Then following World War II five smaller farms were combined with it so they now have 12,967 hectares of which 11,600 are cultivated. It is insisted that the farm is now completely mechanized. During 1957 gross farm income was 8,400,000 rubles in cash. For each labor-day unit, they paid as follows:

Cash	6.35 rubles
Wheat	2 kilograms
Sunflowers	200 grams
Vegetables	1 kilogram
Fodder	2 kilograms

The total cost of this labor-day unit is reckoned at $12\frac{1}{2}$ rubles.

The farm is organized in 6 combined tractor and field brigades.

They cultivate 10,488 hectares. Three brigades look after 444 hectares of vegetables and another brigade has 200 hectares under orchard. The crops run something as follows, in hectares:

Rice	30
Winter wheat	3,135
Spring wheat	600

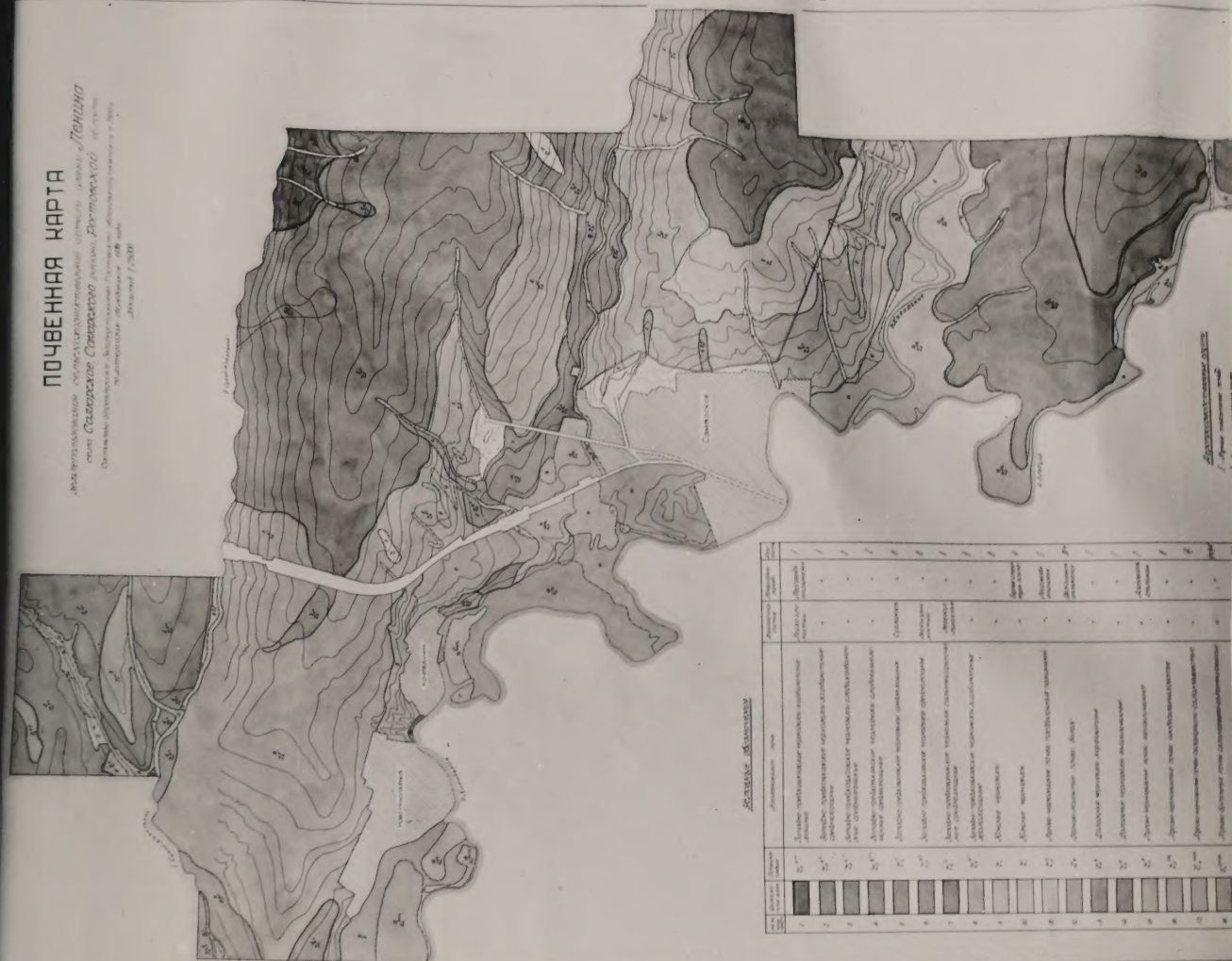
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[illegible]

Seznam članov

[illegible]

K-2556. August 1, 1958. Near Rostov. Soil map of Lenin Collective Farm.

K-5220. August 1, 1928. New Boston. 2017 map of Tenth Collective Farm.



August 1, 1958. Field machinery on Lenin Collective Farm near Rostov. (Photo by Bulik).

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August 1, 1958. At the Lenin Collective Farm near Rostov.
(Photo by Bulik).

August 1, 1958. At the Lenin Collective Farm near Rostov.
(Photo by Bulik).

Barley	1,150
Oats	105
Millet	120
Sunflowers	675
Corn for grain	1,705
Linseed	150
Sudan grass	1,400
Alfalfa and sanfoin	400
Mangel-wurzels	120
Corn for silage	1,250
Hybrid seed corn	173
Clean fallow	250
Occupied fallow	1,200

These figures are a bit confusing because they do not count the land in grass as cultivated land and they count some of the silage and other crops twice, once as crops and once as "occupied fallow." This means some duplicate acreage. For example, too, they plant corn, mow it when it is still small, and fallow the land for winter wheat; although more commonly the occupied fallow follows spring wheat.

Estimates on fertilization are a bit hard to get. They say they use 8 to 10 tons of well decomposed manure per hectare; superphosphate at .1 to .13 tons per hectare; and 45 kilograms of nitrogen as ammonium nitrate.

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Oats	105
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This farm has bought its machines at a cost of 1,878,569 rubles. These include:

Tractors	33
Combine harvesters	23
Silage harvesters	6
Reapers for windrowing	25
Trucks	17
Cars	2

And of course, drills, harrows, etc.

The farm is said to be fully electrified. They give me the following figures on livestock:

Cattle	2,673, including 900 milk cows
Hogs	3,000, including 200 sows. (There are 400 sows that litter but once)
Sheep	3,526
Poultry	86,334, including 10,206 egg-laying hens 500 egg-laying turkeys 2,180 egg-laying ducks 800 egg-laying geese
Beehives	250

Then they give me the following figures of livestock for each 100 hectares available:

Cattle	23
Sheep	30
Hogs	24.4 (on arable land alone)

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24.4 (on arable land alone)	Hogs

They claim to get 3 tons of meat for every 100 hectares in the farm.

Last year's yields were given as follows, in tons per hectare:

Winter wheat	2.1
Barley	1.9
Sunflowers	1.3
Rice	5.5
Corn for grain	2.0
Corn for stover	25

They claim 1,372 kilograms of milk per cow for the first 7 months of this year. They calculate 9.1 tons of milk for each 100 hectares of all land. Eggs averaged 80 per hen for the first 5 months, or 13,000 eggs per 100 hectares of plowed land. They have delivered to the government 3,100 tons of wheat for which they have received 2,400,000 rubles. They get a premium because their wheat is used for seed. They delivered 900 tons of corn.

This farm has 560 families and 960 workers. The chairman insists that he needs all these workers and could use more. This looks ridiculous to me.

They follow generally the following rotation:

1. Fallow
2. Winter wheat
3. Winter wheat
4. Spring wheat
5. Corn or other row crop
6. Barley

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7. Sunflowers
8. Perennial grass
9. Perennial grass
10. Plow

They use fertilizers both before and after planting corn. I see some of the hybrid seed corn and it looks pretty good. I talk about it a bit with the agronomist, who is Miss Nina Lubovna Falenko. She is a graduate of the Azov-Black Sea Agricultural Institute as a seed specialist.

The sunflowers I see here are supposed to run 1.8 tons per hectare with 42 percent oil. These too, will be sold for seed.

Then we go to a field of corn and sudan grass being cut for silage. (K-2557) The crop is fair to good but is being cut from two to three weeks too early for the best protein quality.

Then I look at a field of seed corn that may run 4 tons per hectare. They used manure and superphosphate following wheat. The seed was treated with azotobacter.

We go to supper on the collective farm. Unhappily, Donnan and Cline are feeling ill and have to go back to the hotel.

This area reminds me very much of the Great Plains if one could drop out the sunflowers, increase the number of Norwegians, and paint the faces of the cattle white. I stop briefly to look at a "Pioneer" camp for small children. These Pioneers are very roughly comparable to our Boy Scouts, Cub Scouts, Brownies, and Girl Scouts altogether.

7. Sunflowers 1.5 tons per hectare

8. Perennial grass 1.5 tons per hectare

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10. Plow 1.5 tons per hectare

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K-2557. August 1, 1958. Near Rostov. Harvesting silage on Lenin Collective Farm.

2557-K-2557. August 1, 1958. Near Rostov. Harvesting alfalfa on
Lenin Collective Farm.

But the Pioneers are also educated in politics. Later they graduate from the Pioneers to the Comsomols, and from thence into the Party. I am told that all children on this farm get a chance to go to this camp for one month. This means three groups. The dormitories are fairly clean, but a bit crowded and a bit smelly.

I ask the chairman about the number of people required to keep the farm records. He says there are 18 recorders for the 18 brigades plus 6 at the central headquarters.

We have a late supper in the remains of an old orchard that was essentially destroyed by the Germans. The table is placed under a temporary shelter. Fortunately, for me, a rain starts and comes down quite hard a little after 8. I point out the condition of these country roads and get the party on the road. Because of this hurry we are back to the hotel at 9:30. Donnan is now asleep and Cline is not very ill.

I get ready for an early departure in the morning and go to bed.

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Latin Collective Farm.

August 2

We are up at 5 a.m., pack, and go to the airport with time for tea.

The wheels are up for Krasnodar at 6:40 a.m. Now it is partly cloudy and cool:

I recall that the institutes emphasize checking corn for cross cultivation. But on few farms is it done accurately enough for that. Some of the stands of corn and sunflowers are not very even. The institutes also emphasize fertilizer placement, yet not many of the farms have the machinery to do it.

I notice that in some places the straw is being burned in advance of plowing contrary to the recommendations.

About 30 minutes out I see essentially the same crop pattern as on the last farm yesterday: corn, wheat, fallow, sunflowers, and meadow. The small streams have low dams for ponds. The soil looks to be undulating Chernozem and mostly arable. Although some fields lack shelterbelts, there are quite a few of medium height about one-fourth mile apart.

We fly over a town that I take to be Tikhoretsk at 7:16. Again we have the same pattern of soils and crops. On either side of a railroad are shelterbelts of about 10 rows. Those around the fields look to have about 4 rows. Here the Chernozem is blacker, and probably deeper, than under comparable conditions in our Great Plains. Perhaps more water from these gentle rains gets into the soil; and there is less erosion. I'm told that very heavy rains are rare here,

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we have the same pattern of soils and crops. On either side of a

railroad are shelterbelts of about 10 rows. Those around the fields

look to have about 4 rows. Here the Chernozem is blacker, and

probably deeper, than under comparable conditions in our Great Plains.

Perhaps more water from these gentle rains gets into the soil; and

there is less erosion. I'm told that very heavy rains are rare here,

although they do come occasionally. I see pools in the drainageways but none elsewhere. Only some of the old cereal fields have been heavily burned to destroy both straw and stubble.

Most of the villages are near the streams where a water supply for homes and stock can be had with small dams. I do not see much stock in the meadows.

We are now a few minutes out of Krasnodar. The plane turns west, near the river and the large reservoir pool. Along the stream, the pattern of fields is complex. Near the river, some of the land appears to be unused. Elsewhere the surface is undulating Chernozem with cereals, fallow, corn, sunflowers, and meadow.

The wheels are down at Krasnodar at 8:00 a.m. We are met by several local agriculturists including:

1. Ogurtsov, Nikolai Alekseevich - Chief of the Krai Administration of Water Economy.
2. Pepenko, Karp Alekseevich - Chief Engineer of the Krai Administration of Water Economy.
3. Erofeev, Georgii Pavlovich - Engineer for Exploitation of Irrigation and Water Supply Systems.
4. Belichko, Evgenii Borisovich - Doctor of Agricultural Sciences. Director of the Chair for Amelioration of the Kuban Agricultural Institute.
5. Braun, Georgii Pavlovich - Chief of the Administration of Construction of Rice Irrigation Systems.
6. Ermolaev, Vladimi Aleksandrovich - Chief Engineer of the Krasnodar Filial "Giprovodkhoz".
7. Akimenko, Dmitrii Afanasevich - Chief Engineer of the Trust "Meliovodstroi".

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As we drive into the city, I see only fair home gardens with fruit and vegetables. Because of recent rains the side streets are muddy and impassable to cars. The main road is cobblestone. (In this Zim car the clock also works.) I see peat cakes for fuel piled up by the houses. Ditch diggers along the city street are more than one-half women, fairly well dressed in cotton prints. We pass a large church in good repair that is being used as a church. The interior of the city looks quite nice with many small trees along the streets.

We reach the Krasnodar Hotel at 8:35 and have a slow and elaborate breakfast.

Here the first subdivision is not the oblast but the "krai".

At 10:50 a.m. we go to the office of the Department of Water Economy of the Administration of the Krasnodarskaya Krai and discuss our program. They speak of the Kuban area, or Krasnodar region, as having 82,000 sq. km. About 6,000,000 hectares are under crops. As usual, we are told that climatic and soil conditions vary. In the north there is about 400 millimeters of rain and it goes to 1,200 near the coast of the Black Sea. In the central part, in the valley of the Kuban, it is around 600 to 700. The average temperature goes from around 10°C in the north to around 13° in the south. The soils in the north are weakly carbonated, carbonated, and ordinary Chernozem with ordinary Chernozem and leached Chernozem in the southwest.

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In the north, grain crops predominate. In the central part they have grain, sunflowers, castor beans, oil crops, tobacco, and sugarbeets. Further south there is grain, vegetables, orchards, vineyards, and tobacco. Each area has livestock including sheep, hogs, poultry, and some cattle. Lately the farmers of the Krai have been anxious to get new crops. Sugarbeets are increasing and processing plants are being built. The acreage of sugarbeets has gone up 4 times since 1953. Corn both for grain and forage is increasing in the northern and central parts of the Krai. Orchards and vineyards are expanding. From 65,000 hectares of orchards they expect to go to 200,000 by 1970. Last year they had only 52,000 hectares in orchard. From 43,000 hectares of vines they plan to go to 300,000. Some of this increase will come from new land and some by changes in the present cropping systems. They grow about 107 different crops. The main one is winter wheat. (The grains as a whole account for 54 percent of the cropland.) After wheat the crops are as follows in order of importance: spring barley, spring rye, oats, pulses, corn as grain (12%), rice sugarbeets, sunflowers, coriander, hemp, fiber flax, and castor beans. They also grow the usual vegetables, tobacco, and crops for essential oils.

They emphasize that the collective farms are free to grow the crops most suitable for them!! A few places have citrus.

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Many collective farms have been combined into larger ones. Of course, this process has been going on all over the Soviet Union. (I have heard the figure of 90,000 collective and state farms for the whole USSR.) In this Krai they had 2,400 collective farms in 1940 and only 433 in 1958. They average about 10,000 hectares. The state farms went from 132 in 1940 to 142 in 1958 with an average size of 6,500 hectares. It is said that both kinds of farms grow about the same crops; but I strongly suspect that the more valuable ones calling for large capital outlays are emphasized on the state farms.

I am given some statistics about livestock that seem curious to an American:

27.7 cattle per 100 hectares including crop and pasture land

but not forest land;

11.9 cows per 100 hectares;

48 hogs per 100 hectares of planted land;

31 sheep per 100 hectares of total agricultural land; and

647 poultry per 100 hectares of land under grain.

Most cattle are dual purpose but some are milk cows. Last year they report an average of 2,330 kilograms of milk per cow. (I am suspicious of this figure as some kind of gross not comparable to our reported figures.) Last year they had 25 tons of milk per 100 hectares of total agricultural land. Emphasis is being given to increasing milk production per cow.

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Shelterbelts are essential in this Krai, especially in the northern part. Some of the small ones replace those destroyed by the Germans; some are entirely new. All the northern and central parts of the Krai were occupied by the German army and the destruction was great, especially in Krasnodar and in the west.

They tell me that about 75 percent of the population of the Krai are farm people. (This is certainly too high for a good economy.)

Average yields of winter wheat are as follows, in tons per hectare:

1956	1.5
1957	2.03
1958	2.55
Plan for 1960	2.6

They say that both 1957 and 1958 were better-than-average years. They hope to have better varieties widely grown and higher rates of both mineral and organic fertilization. They recommend that farmers burn only stubble, not straw, and then only when it is helpful in destroying pests.

Water economy is discussed by the chief engineer of the water department of the Krai, Mr. July. The Kuban River, called the King of Rivers, is the principal water resource. It rises near Mt. Elbruse of the Caucasus Chain. It goes to the Azov Sea in two beds west of Krasnodar. A third one formerly went directly to the Black Sea, but this is now only a canal. The flow in the river is variable. It floods in early spring and again in the beginning of summer. Before the construction of the present dams, embankments, and two flood-water reservoirs, the river flooded 650,000 hectares. A main task of the

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work is to control the floods. In the steppe zone several small rivers flow directly into the Azov Sea only during spring and early summer. (I had seen some of the dams on these streams.) In the future some water from the Kuban must be sent up to the steppe zone. It is a problem to control the mountain rivers that flow into the Kuban. In its lower reaches, parts of the river are higher than the near-by land. This permits gravity irrigation below Krasnodar.

The water is used in the lower reaches for rice and they plan a large expansion of this crop. This will involve drainage into the Azov Sea. They now have 33,000 hectares of irrigated rice, with works for 24,000 under construction and a total of 65,000 is planned for the future. Other systems are developed or planned for other crops for a total of 30,000 hectares in small areas.

Now they use on rice 23,000 cu. meters per hectare from the river, of which 18,000 cu. meters per hectare reach the fields, and about 10.5 cu. meters are actually absorbed by the soil. Three thousand to 3,500 cu. meters are evaporated from each hectare during growth. They estimate 4,000 to 4,500 cu. meters for transpiration during the vegetative period. This varies with the rainfall. Around 1,800 cu. meters are lost in drainage and seepage.

They have a serious problem of silting. Apparently a lot of loess gets carried down in the stream. About 23 percent is caught in settling basins, 56 percent in the distribution system, and 2.5 percent goes into the drainage water. They remove about 20 to 40 tons per hectare in cleaning the canals.

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We are presented with several issues of a new agricultural magazine. One issue is missing; perhaps it has some interesting statistics in it.

We leave at 1:00 p.m.

After lunch we go to the Kuban Rice Experiment Station which was organized in 1932 under the Ministry of Agriculture of the Russian Republic. They list the following sections:

1. Administrative
2. Agro-technical
 - a. Agro-chemical
 - b. Plant physiology
3. Selection and breeding
4. Economy of organization, including mechanization
5. Scientific laboratory
6. Experimental farm of 60 hectares at some distance from the city.

Initial experiments are conducted in and around this building within the city. From there experiments go to the experimental farm and then tests are made on state and collective farms in the lower Kuban, in the Don basin, in the Terek River delta, and in the lower Volga. They gave up the idea of permanent experimental fields in these areas and depend upon temporary plots handled by expeditions.

They maintain they have solved the two main problems for which the Institute was founded:

1. The development of new agro-technical methods for growing rice that would permit mechanization, including harvesting. They had to invent an irrigation system of plots unlike those of the Orient.

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They had to breed new varieties with short vegetative

and enough response to length of day so that the crop



August 2, 1958. At the Kuban Rice Station in Krasnodar.
(Photo by Bulik). 2 or 3 years of rice, 1 year of
wheat, 1 year of soybeans, and fallow or occupied fallow. This makes
a total of 25 percent rice, 25 percent perennial grass, and
50 percent fallow.

5-10

K

August 2, 1958. At the Kaban Rice Station in Krasnodar.
(Photo by Bulik).

2. They had to breed new varieties with short vegetative periods and enough response to length of day so that the crop would ripen in this latitude (about 44° to 48°.) They now have some that can be matured at 50° latitude and are already growing rice on a fair scale at 48°. They have developed 20 new varieties, of which 12 are grown on a large scale after governmental approval.

They have developed new irrigation systems and new machinery, including reapers for windrowing, a combine harvester, and a special plow for spring plowing.

All of these results are described in a monograph on Physiological elements of rice irrigation by Professor P. S. Erygin.

They are now concerned with developing rice throughout the southern part of the Soviet Union. This station has educated a whole group of rice growers. Besides the school for rice growers they train graduate students of the USSR and other countries.

The scientific staff of nine includes one Ph.D. and eight masters candidates.

(As the day is advancing, we take a brief recess and Dr. Nelson and Mr. Bulik leave for a visit to the All-Union Institute of Tobacco and Makhorka.)

For rice they use a rotation of 2 or 3 years of rice, perennial grasses (mainly alfalfa), and fallow or occupied fallow. This works out for a field to be 62 percent rice, 25 percent perennial grass, and 13 percent bare fallow.

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13 percent bare fallow.

The rice is grown on rather clayey soils from silty alluvium, but not on very heavy clays. Many of these are former peaty soils exposed after control of the floods. These are also mixed with alluvium from surrounding areas. The crop is seeded with drills just before flooding. Two-thirds of the fertilizer is applied with drills before flooding and one-third with planes after the rice comes up. They also use planes for applying herbicides. They use ammonium sulphate to get about 60 to 90 kilograms of nitrogen per hectare, potassium salts to get about 40 pounds of K_2O , and superphosphate according to need.

They have not studied micro-nutrients enough to make recommendations. They have no "cat" clays.

They flood immediately after sowing to cover the whole field to about 8 to 10 centimeters. After the rice sprouts they flood again to 12 to 18 centimeters, depending on the weather and the amount of weeds.

They can grow fish with the rice but this is not popular with farmers because it complicates the harvest and attracts herons onto the fields. The fish and rice combination works better far from the sea than near the sea. It is claimed that the rice yields are better if fish (carp) are grown with the crop. Perhaps these fish weighing about 200 to 300 grams disturb the film on the soil surface and increase aeration.

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Upland rice yields 3.5 to 4 tons per hectare but it costs too much to control weeds. Were it not for the weeds the cost of upland rice would be lower; but as it is it is 2 or 3 times higher.

They reckon 18,000 cu. meters of water per hectare for rice, not counting losses (I take it canal losses.) They plant rice on fairly salty soils; as time goes on the salts disappear.

Since they need to have soils where there is water, they try to breed varieties for different kinds of soil including marshy and salty ones. They use:

1. Young alluvial soils
2. Marshy soils with a pH of about 6 to 6.5
3. Meadow soils. Here the humas horizon is darker and thicker and the structure better. The lower horizons are gleyed and almost impermeable. The soils are rich in ferrous iron.
4. Chernozem-like soils with thick A_1 horizons of about one meter. The lower horizons are gleyed and compact. This is the best soil for rice. It is rich in nutrients and has a good physical condition for holding water. They get 7 to 8 tons of rice per hectare.
5. Ordinary Chernozem.

Soils 2 and 3 above are hard to cultivate because of the high silt content. In some of the areas they have had success on Solonchak and Solonetz. In some areas the plots were originally acid but have become carbonated by the alluvium in the irrigation water. Most ordinary Chernozem is too permeable for economic rice growing.

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They have studied the soil changes under rice. Ammonification is speeded up. Since nitrate forms are unimportant to rice, any accumulation of nitrates is wasteful since these are reduced and lost as nitrogen gas. Ammonia formation is encouraged by green organic matter. Thus 2 years of alfalfa fixes 180 to 250 kilograms per hectare of pure nitrogen converted to the ammonia form. This provides for high yields of rice for 2 or 3 years. Continuous rice culture over 15 or 20 years without fertilizer exhausts the nitrogen.

Phosphorus is second to nitrogen since the soils are fairly rich in phosphorus. Potash comes in with the irrigation water. Thus fertilizers with these two elements are needed only at high levels of nitrogen.

They found that the higher the moving ferrous iron, the lower the yield of rice and the poorer the soil structure. After plowing under perennial grasses they have 100 to 150 mg. of iron per kilo of dry soil; but on soils long used for continuous rice they found 5,000 mg. per kilo of dry soil. To determine ferrous iron, they extract the soil with 0.01 N HCl using moist soil and taking account of air and moisture.

They consider aeration as the important objective of tillage. The crop rotation system provides for dry fields after rice in order to dry the soil. The maximum depth of plowing is 27 centimeters. In years of low temperature they delay operations for the soil to become warm. In some regions, shallow basins are made for heating the water but this is not a common practice.

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Another speaker suggests plowing in the fall to 20 or 25 centimeters. They are trying to find herbicides to reduce the hand weeding.

Bunds make the use of tractors difficult. The larger the plot the lower the cost of tractor use. Commonly they have 1.5 to 2.0 hectares in one paddy plot. They now have some fields about 230 meters wide and 1 to 1.5 km. long. This gives them around 20 to 40 hectares that are divided into individual plots of 1.5 to 2.0 hectares. For 1,000 hectares this requires 12 km. for main and distribution canals for irrigation and 11.2 km for drainage canals. Head ditches make another 44 km. for both irrigation and drainage. Then there are 14 km. of roads.

Weeds are a serious problem. One tries to manage the water to help the rice and to suppress the weeds. When flooded after seeding they try to keep the soil wet but not to maintain a specific level of water. When the seedlings clearly appear they flood and try to cover the weeds completely. Then the water level needs to be relatively low up to the tillering stage. After tillering until the dough stage water is maintained at about 12 centimeters. Then the water is shut off until the soil is dry enough for harvest. The drains are open after tillering.

The surface is prepared precisely by land leveling to a precision of ± 5 cm. Deep cuts reduce yield and are avoided. Normally they move about 300 cu. meters of soil per hectare.

Another speaker suggests plowing in the fall to 20 or 25 centimeters. They are trying to find herbicides to reduce the hand weeding.

Bunds make the use of tractors difficult. The larger the plot the lower the cost of tractor use. Commonly they have 1.5 to 2.0 hectares in one paddy plot. They now have some fields about 230 meters wide and 1 to 1.5 km. long. This gives them around 20 to 40 hectares that are divided into individual plots of 1.5 to 2.0 hectares. For 1,000 hectares this requires 12 km. for main and distribution canals for irrigation and 11.2 km for drainage canals. Head ditches make another 4 km. for both irrigation and drainage. Then there are 14 km. of roads.

Weeds are a serious problem. One tries to manage the water to help the rice and to suppress the weeds. When flooded after seeding they try to keep the soil wet but not to maintain a specific level of water. When the seedlings clearly appear they flood and try to cover the weeds completely. Then the water level needs to be relatively low up to the tillering stage. After tillering until the dough stage water is maintained at about 12 centimeters. Then the water is shut off until the soil is dry enough for harvest. The drains are open after tillering.

The surface is prepared precisely by hand leveling to a precision of ± 5 cm. Deep cuts reduce yield and are avoided. Normally they move about 300 cu. meters of soil per hectare.

This speaker opposes windbreaks in rice fields because he thinks the trees take too much water. (Added later: After visits to the rice-growing area my guess is that this is a minority view).

We take a look at the physiological laboratory and the small research plots near the building. (K-2558)

We have dinner at 7:00. This being my birthday, my colleagues present me with a package of tea.

The maitre d'hotel here is an experienced one who is very anxious to please us. Of course, I don't know, but I suspect he may have been brought here for the period of our visit. Although a respectable dining room, with the usual loud music of such places, they have a few rough customers who have to be helped out.

After dinner we have a short conference of the delegation.

Again today it was a bit hard to get straight-forward statements of production, especially of milk.

I am going to bed early despite having a room facing the street on a noisy Saturday night.

This speaker opposes windbreaks in rice fields because he thinks the trees take too much water. (Added later: After visits to the rice-growing area my guess is that this is a minority view).

We take a look at the physiological laboratory and the small research plots near the building. (K-2528)

We have dinner at 7:00. This being my birthday, my colleagues present me with a package of tea. This gives them some idea of the matter d'hotel here is an experienced one who is very anxious to please us. Of course, I don't know, but I suspect he may have been brought here for the period of our visit. Although a respectable dining room, with the usual loud music of such places, they have a few rough customers who have to be helped out.

After dinner we have a short conference of the delegation.

Again today it was a bit hard to get straight-forward statements of production, especially of milk. Not so with a specific level of water. I am going to bed early despite having a room facing the street on a noisy Saturday night. The water level needs to be relatively low up to the filling stage. After filling until the stage stage water is maintained at about 15 centimeters. Then the water is shut off until the soil is dry enough for harvest. The drainage are open after filling. The surface is prepared previously by level leveling to a depth of 5 cm. Deep water reduces yield and are avoided. It is only when water about 300 cm. meters of water are needed.



K-2558. August 2, 1958. Krasnodar. At the Kuban Rice Station.

This speaker opposes withdrawal in the Pacific because the

thing the first takes too much money. (Latter part of speech omitted)

the rice-growing area of Japan is about 100,000,000 acres.

K-2528. August 2, 1958. Krasnodar. At the Kuban Rice Station.

Yield Per Hectare (Metric)	Yield per acre in American units							
	Pounds	Potatoes bu. 2/	Sugarbeets, Fodder, etc. tons	Wheat bu. 3/	Corn bu. 4/	Oats bu. 5/	Rice bu. 6/	Cotton bales, lint 7/
1 ton 1/	892.55	14.8		14.8	15.9	27.9	19.8	.62
2 tons	1,785.10	29.7		29.7	31.9	56.0	39.7	1.25
3 tons	2,677.56	44.6		44.6	47.8	83.7	59.5	1.87
4 tons	3,570.20	59.5		59.5	63.1	111.6	79.3	2.51
5 tons	4,462.75	74.4	2.23	74.4	79.7	139.5	99.2	3.13

CONVERSION TABLE

Tons	
4.47	10 tons
8.93	20 tons
17.86	40 tons
22.32	50 tons

One kilometer	=	.62137 mile
One meter	=	39.37 inches
One centimeter	=	.3937 inch
One millimeter	=	.03937 inch
One inch	=	2.54 centimeters
One liter	=	1.0567 quarts
A liter of water	=	2.2046 pounds
One cubic meter	=	1.308 cubic yards
One centner	=	220.46 pounds
One metric ton	=	2,204.6 pounds
One hectare	=	2.47 acres
One acre	=	.4047 hectare

1/	Metric ton
2/	60 pounds
3/	60 pounds
4/	56 pounds
5/	32 pounds
6/	45 pounds
7/	35% conversion

